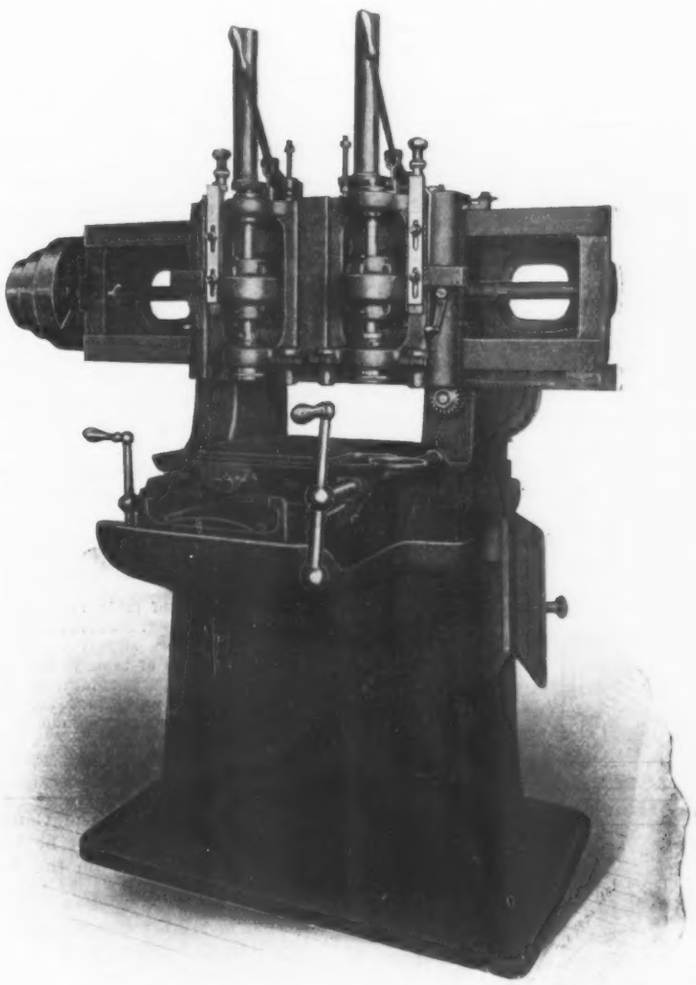
THE IRON AGE

THURSDAY, JULY 17, 1902.

New Model Two-Spindle Profiling Machine.

The photograph reproduced herewith in half-tone, together with the drawings, illustrates a new two-spindle profiling machine for metal work, recently placed on the market by the Pratt & Whitney Co. of Hartford, Conn.

The machine is of the same design as those being built for the Government arsenal at Rock Island. It is compact, occupying small amount of floor space, and seems to be an exceptionally rigid machine and capable of withstanding severe usage. The bed is in the form of a column and contains two large tool cabinets and a removable tank for oil or other lubricant. It is quite heavy and thus provides a firm support for the working parts above. The bed is provided with suitable troughs for properly carrying off lubricant to prevent wasting.



NEW MODEL TWO-SPINDLE PROFILING MACHINE.

The table is held down to the bed by two straps. It is fitted to the bed by a V at the left and has a flat track at the right, instead of two V's. This construction has been adopted on a number of Pratt & Whitney Company's tools, as a long, narrow bearing resists the twisting tendencies much better than a wide bearing of equal length. It is further true that two V's, when worn, and frequently when new but under cutting strains, do not fit on both sides of each V, but are apt to fit on the outer side only of each V. This possibility is obviated on the single V and flat track construction.

Each spindle is driven by means of a large worm and worm gear, Figs. 2 and 3, the worm being 6 inches diameter and the gear 4 inches diameter, thus providing large tooth contact and ample wearing surfaces. The pitch of the worm is such as to increase the speed of the worm gear at a rate of 3 to 2, instead of giving a reduction, thus permitting of high spindle speeds without excessive speed to the driving shaft. The worm is made from a steel casting and the worm gear from phosphor bronze. Both the worm and worm gear have hubs journaled in bearings independent of the driving shaft and spindle bearings. The cutter spindles are thus more sensitive and as close fitting to the worm and worm gear, as regards tooth contact, as is possible. The worm is driven by two long keys, located in the shaft diametrically opposite to each other; this balances the drive. Ball thrust bearings are provided at each end of the worm and worm gear, and the cutter spindle may thus be rotated with equally good results in either direction, producing a very free running and durable drive.

The cutter spindles are of steel, are ground and run in bronze bearings. The lower bearings are solid and of conical form. The upper bearings are of cylindrical

form; the bushings are externally tapered and split and may be adjusted to closely fit the spindle to take up wear by means of annular nuts. The spindle end thrust is taken at the lower bearing by babbitt metal washers. The spindles have been run as high as 1200 revolutions per minute. Each head when not in use is raised by a heavy inclosed spiral spring, and is quickly lowered to bring the cutter into proper relation with the work by a lever and clamped to position. A lock bolt engaging a slot in the adjustable bar is provided for properly locating the head, and a screw with micrometer dial facilitates the close adjustment of the bar. The position of the head may also be determined by the adjustable stop located at the top. The spindles of the No. 11 machine are regularly fitted with No. 5 Jarno taper and of the No. 12 machine with No. 7 Jarno taper. Spindles with special taper can be furnished when desired. The driving cone, which is counterbalanced, is journaled on a stiff sleeve, instead of being coupled directly to the driving shaft, as shown in Fig. 4.

The gearing for operating the table and cross slide is so constructed as to permit all back lash to be taken up by means of double gears or double racks, so arranged that one part may be adjusted in relation to the other part so that the teeth of each part do not exactly line up, but do fill the space of its mating rack or gear. When properly adjusted the two parts of the member may be firmly clamped together by conical studs.

The right hand spindle head is provided with an extra former pin hole located on the opposite side of the spindle from that in which the pin regularly fits. The centers of the two holes are located equidistant from the center of the spindle and in the same plane with it.

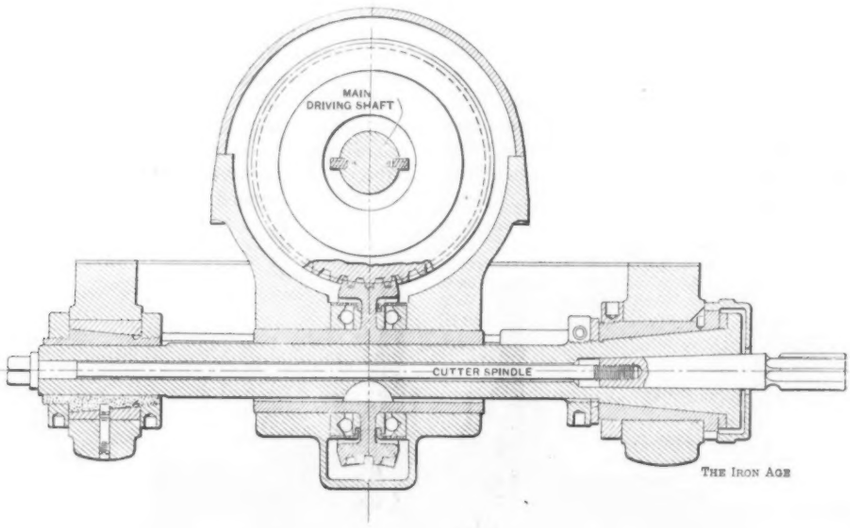


Fig 2.—Section of Spindle Drive.

In order to produce a profiling former plate directly from a model piece of work the latter may be fastened to the table in position where the work regularly rests and the blank former plate fastened to the position in which the finished former is afterward to be used. Then with the former pin in the extra hole the blank may be profiled.

The principal dimensions of the two machines are:

	No. 11. Inches.	No. 12. Inches.
Working surface of table	8 x 10½	12 x 15
Movement of table	17¾	23½
Movement of cross slide	19½	26¾
Distance from top of table to bottom of cross slide	4	5¼
Distance between uprights	14	19
Distance from center of spindle to center of guide pin	3	4⅛
Vertical movement of head	2 13-16	3⅝
Floor space	54 x 39	72 x 53

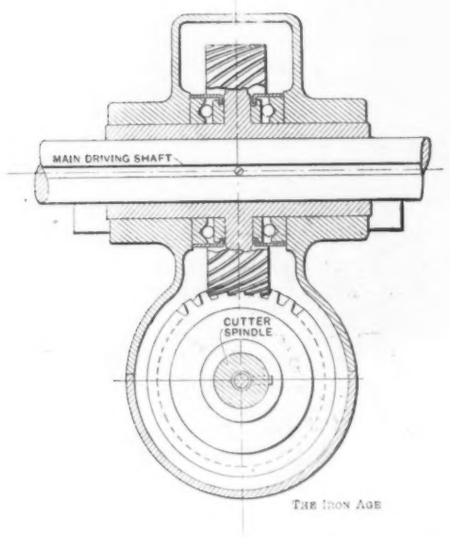


Fig. 3.—Section of Fig. 2.

The operations of the Cambria Steel Company, at Johnstown, Pa., will not be interrupted to any extent by the mine disaster on the 10th inst. While this cut off a large part of their coal supply, they immediately arranged to procure enough from outside mines to keep their works in regular operation. The mine in which the explosion occurred was reopened on the 14th in some of the workings, and as speedily as possible the full force of miners will again be employed.

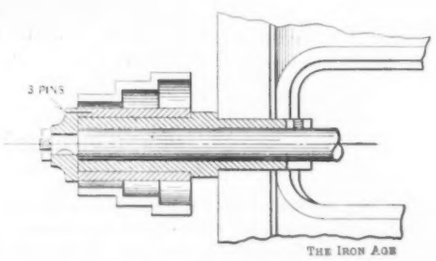


Fig. 4.—Detail of Driving Cone.

NEW MODEL TWO-SPINDLE PROFILING MACHINE.

Status of the Various Reciprocity Treaties.

All But One Expire This Summer.

WASHINGTON, D. C., July 15, 1902.—The State Department is in receipt of inquiries from representatives of commercial interests in various parts of the country as to the status of the French treaty and other pending reciprocity conventions, in view of the adjournment of Congress without action thereon, and also as to the general outlook for these treaties in the future. The information which the Department feels at liberty to impart on this subject is not as full as it might be because of the diplomatic aspect of the matter, but, in an unofficial statement made to the correspondent of *The Iron Age*, a representative of the Department has given some interesting details.

Of the eight pending treaties, all but one, that between the United States and the Dominican Republic, will expire before the reconvening of Congress in December. All of these treaties have been renewed two or three times, and the last time under extraordinary circumstances which then seemed to indicate that no further renewal would be solicited by either of the two contracting parties. The Senate Committee on Foreign Relations has taken no action on any of the treaties and apparently intended to ignore them, and as a result Commissioner Kasson recommended to the Secretary of State that no further action be taken by the Department looking to their renewal except upon the initiative of the Government with which they were negotiated. In each case, however, these governments solicited the renewal of the treaties and the State Department promptly agreed to their extension, not only as an act of courtesy but in the hope that some of them would be ratified by the Senate. The extension was then made for 18 months, an unusually long period, in order that none of them should expire until after the adjournment of the session of Congress which has just terminated.

It will be remembered that during the recent session the Senate Committee on Foreign Relations, by a very close vote, cast under somewhat peculiar conditions, reported favorably to the Senate all of the treaties except those with Jamaica and the Argentine Republic, which by a large majority were indefinitely postponed.

A New Argentine Convention Possible.

As to the renewal of these treaties the correspondent of *The Iron Age* is in position to make a definite statement. The pending conventions with Jamaica and the Argentine Republic will not be renewed and for other reasons than because of their formal rejection by the Senate Committee. The trade with Jamaica, which the treaty was designed to divert to the United States, is about to be directed to Great Britain by the establishment of steamship lines, and the people of the island are no longer in need of a market in the United States. The Argentine treaty, against which the wool growers have raised such strenuous protests, not only lacks support in Congress, but the State Department is now disposed to regard as a serious error the fact that Minister Buchanan in negotiating this treaty exceeded his instructions by making a 20 per cent. concession on wools of Class 1 as well as Classes 2 and 3, to which his authority was restricted. It would not be surprising, however, in view of the facts concerning the Argentine treaty that a new convention should be negotiated similar in all respects to that now pending except with regard to the concession on wools of Class 1, which would be eliminated. The shoe and leather manufacturers of the United States are strongly in favor of the ratification of the Argentine treaty, which reduces the duty on Argentine hides imported into the United States by 20 per cent., and they also have the support of the wool manufacturers of New England.

Other Treaties Expected to Be Renewed.

With regard to the French and other reciprocity treaties it can be stated that the United States will not seek their renewal, and, unless the foreign governments concerned take the initiative, they will be permitted to expire. It is expected, however, that several of these governments, including that of France, will suggest the extension of those conventions, and the State Department, with a view of keeping the subject alive, will probably acquiesce in the requests. Special interest naturally centers about the French treaty, which is the most important on the list and which will expire in ten weeks, during the summer holiday season of the diplomatic corps. It is quite probable that no renewal will be agreed to before the date of expiration, but in this connection the interesting statement is made that with regard to all these conventions an understanding exists under which they may be revived at any time after their expiration, whenever, in the judgment of the Secretary of State, it is expedient to take this action.

The Administration Still Favors Reciprocity.

It may be frankly stated that the Administration does not count upon the ratification of any of the pending treaties by the present Congress, which will terminate March 4 next. The officials of the State Department, however, are anxious that the reciprocity principle should not be lost sight of for two important reasons; first, because during 1903 the reciprocal trade conventions between the principal countries of Europe will expire and will be renewed on bases which are being negotiated and in which the United States has a heavy stake; and, second, it is regarded as a foregone conclusion that within a comparatively short period Congress will be compelled to comprehensively revise the present tariff. If the pending reciprocity treaties fail ignominiously, and no others are negotiated, the United States will be placed at a great disadvantage in dealing with foreign countries after their reciprocal trade relations have been readjusted by the new conventions now in prospect. The Administration hopes that Congress will be wise enough, in the event that all the pending treaties fail, to provide a new basis for reciprocity in the tariff revision which, it is thought, cannot be much longer postponed.

Suggestion of Maximum and Minimum Schedules.

In this connection there is a revival here of the suggestion that maximum and minimum schedules shall be prepared by Congress when the tariff revision is made, which would at once establish a basis for reciprocity negotiation. With such a tariff in force the amount of the concession to be made would be regulated by Congress, and the State Department would be limited to the selection of the particular items on which the lowest rates would be conceded to the country with which a reciprocal convention happened to be in process of negotiation. It can be very emphatically stated that the President and his advisers have not abandoned the principle of reciprocity and that they hope to see it established in some practical manner which will make it a comparatively easy matter to extend it wherever it will be of advantage to the American export and import trade.

The Cuban Treaty.

Special attention will be directed to the importance of reciprocity with European countries by the President's action in sending to the Senate a treaty providing for reciprocity with Cuba. This treaty will go to the Senate Committee on Foreign Relations in the ordinary course of events, rather than to the Committee on Relations with Cuba, which recently had charge of the Spooner reciprocity bill; and it is the purpose of those who are opposing Cuban reciprocity to place this treaty on the executive calendar immediately behind the French treaty, so as to force consideration of the French treaty in advance of all others. As Senator Aldrich proposes to insist upon a reference of the French treaty to the Finance Committee to determine its effect upon the revenues, a similar motion will be made as to the Cuban treaty, and thus the two conventions may be kept in the same category until disposed of. Chairman Payne of the House Ways and Means Committee has added to the interest in the situation by a statement made here this week to the effect that both the Cuban and French treaties will require approval by

the House as well as the Senate before becoming operative. The Senate has repudiated this idea, and a very lively contest with regard to it is in prospect. W. L. C.

The Selection of Steel for Various Articles.—II.

We print below a list of a series of articles accompanied by the carbon contents which have been found by experience to be the most suitable for the purpose to which the steel has been put.

Articles Made from Open Hearth and Bessemer Steel.

A.		
Arbor steel	0.35 to 0.40	Open hearth.
Auger, open hearth coal	0.97	Open hearth.
Axles	0.25 to 0.30	Open hearth (A).
B.		
Back, knife	0.28	Bessemer or open hearth.
Back, scythe	0.28	Bessemer.
Bars, crow	0.50 to 0.60	Open hearth.
Bars, digging (handles)	0.35 to 0.40	Open hearth or Bessemer.
Bars, lining	0.60 to 0.65	Open hearth (A).
Bars, railroad claw	0.60 to 0.65	Open hearth (A).
Bars, railroad tamping	0.20 to 0.25	Open hearth (A).
Beams, steel eye	0.15 to 0.35	Open hearth or Bessemer.
Bits, auger	0.60 to 0.70	Open hearth.
Blades, harrow	0.70 to 0.80	Open hearth (A).
Blades, stone saw	0.28	Bessemer.
Box, fire	0.10	Open hearth (A).
C.		
Can openers	0.55 to 0.80	Open hearth (A).
Channels	0.13 to 0.35	Open hearth or Bessemer.
Chisels, agricultural	0.62 to 0.72	Open hearth.
Cleaner, disk	0.70	Open hearth.
Clip, knife	0.25 to 0.35	Open hearth.
Clip, for springs to be welded to	0.10	Bessemer.
Colters and wheel irons, for sugar plow	0.10	Bessemer.
Colters	0.95 to 1.05	Open hearth (A).
Cutter, corn stalk	0.65 to 0.76	Open hearth (B).
D.		
Die, trimming	1.05	Open hearth (A).
Die, shoe	0.20 to 0.30	Open hearth (A).
Disk, drill	0.70 to 0.85	Open hearth (A).
Disk, harrow	0.70 to 0.85	Open hearth (A).
Disk, plow	0.70 to 0.85	Open hearth (A).
Dogs, cant	1.02	Open hearth.
Driver, screw	0.60 to 0.70	Open hearth.
F.		
Flange	0.25	Open hearth (A).
Forceps	0.89	Open hearth (B).
Fork, open hearth	0.85 to 0.95	Open hearth.
Frogs	0.30 to 0.40	Open hearth (A).
Fullers	0.65 to 0.70	Open hearth (A).
H.		
Hammer	0.85	Open hearth.
Hoe	0.60 to 0.70	Open hearth.
Holder, cord	0.70	Open hearth.
Hub	0.10	Bessemer.
J.		
Joint, artificial limb	0.40	Open hearth.
Jordan	0.58 to 0.62	Open hearth (A).
K.		
Keys	0.28	Bessemer.
L.		
Lay, German hammered	0.28	Bessemer.
M.		
Machinery for bolts	0.10	Bessemer.
Magnet for telephones, &c.	0.56	Open hearth (A), (high mn).
Mattock	0.65 to 0.75	Open hearth (B).
Mauls, wood choppers'	0.70 to 0.75	Open hearth (A).
P.		
Pick	0.65 to 0.80	Open hearth (B).
Pick, quarry	0.80 to 0.85	Open hearth (A).
Pick, stone	0.80 to 0.85	Open hearth (A).
Pistons, rock drill	0.60	Open hearth (A).
Pitman	0.40	Open hearth (A).
Plates, floor	0.15 to 0.20	Open hearth or Bessemer.
Plates, frog	0.10	Open hearth (B).
Plates, skate heel	0.12 to 0.14	Open hearth (A).
Plow, German hammered point	0.28	Bessemer.
Points, frog	0.28	Bessemer.
Points, cultivators'	0.28	Open hearth.
Points, plow	0.28	Bessemer.
Pole, axe	0.10	Bessemer.
Punch, agricultural	0.62 to 0.72	Open hearth.
R.		
Rake, garden	1.15	Open hearth (A).
Rasp	0.35 to 0.40	Open hearth.
S.		
Saw, lathe	0.65	Open hearth (B).
Screws	0.28	Bessemer.
Screws, set	0.55 to 0.65	Open hearth.
Shafting	0.10 to 0.28	Open hearth or Bessemer.
Shear, sheep	0.96	Open hearth.
Shoe, sleigh	0.28	Bessemer.
Shovel	0.45 to 0.60	Open hearth.
Sledge	0.70 to 0.75	Open hearth (A).
Sole, sled	0.28	Bessemer.
Spike	0.20	Bessemer.
Spindle, radial drill	0.28	Bessemer.
Spindle, lathe	1.05 to 1.10	Open hearth (A).
Spoon	0.10	Open hearth.
Springs	0.90 to 1.05	Open hearth (B).
Springs, railroad coil	0.95 to 1.05	Open hearth (B).
Springs, railroad leaf	0.85 to 0.95	Open hearth (A).
Stay bolt	0.15	Open hearth (B).
Swedges, blacksmiths'	0.65 to 0.75	Open hearth (A).
T.		
Tank	0.10	Bessemer.
Tees	0.15 to 0.35	Open hearth or Bessemer.
Teeth, bundle carrier	1.20	Open hearth (B).
Tire	0.10	Bessemer.
Toe calk	0.28	Bessemer.
Tooth, harrow	0.75 to 0.80	Open hearth (B).
Tooth, horse rake	1.25	Open hearth (B).
Tongs	0.30 to 0.40	Open hearth (A).
Trams	0.10	Bessemer.
Tubes	0.15	Open hearth or Bessemer.
Trangs	0.10	Bessemer.
W.		
Washer	0.10	Bessemer.
Washer, disk	0.10	Bessemer.
Wedge, coal	0.25 to 0.50	Open hearth or Bessemer.
Wedge, saw	0.25 to 0.50	Open hearth or Bessemer.
Wedge, stone	0.25 to 0.50	Open hearth or Bessemer.
Wedge, wood	0.25 to 0.50	Open hearth or Bessemer.
Wire, fence	0.15 to 0.20	Open hearth or Bessemer.
Wire, telephone	0.15 to 0.20	Open hearth or Bessemer.
Wrenches, railroad track	0.12 to 0.15	Open hearth.
Y.		
Yokes for M. C. B. couplings	0.10	Open hearth.

The Direct Production of Steel by Electricity.

Consul Robert S. S. Bergh of Gothenberg sends the following translation from a recent issue of the *Trading and Shipping Journal*, of that city: At the meeting of the Iron Manufacturers' Association, Engineer F. A. Kjellin and Mr. Benedicks gave some very interesting information about the production of electro steel at Gysinge.

The problem of smelting steel by electricity has for a long time attracted the attention of inventors, and experiments have been made here. By the advice of Engineer Kjellin, Mr. Benedicks decided in 1899 to build at Gysinge an electric steel furnace without electrodes. In the latter part of February, 1900, the first furnace was finished and ready for trial, and after a few experiments the first ingot was produced. The steel was found to be of excellent quality. The problem was thus solved technically, but not economically; for, with the dynamo of 78 kw. used, not more than 575 pounds of steel were obtained in 24 hours, and in the furnace there was not room for more than 176 pounds. A larger furnace was seen to be necessary, and this was completed in November, 1900, and proved to be a great improvement. In the second furnace, which held 397 pounds, from 1220 to 1340 pounds of steel were produced in 24 hours. The Gysinge sulphite factory burned down on August 11, 1901, and it was decided to build steel works in its place and to use the water power available there. For the steel furnace there was utilized a turbine of 300 horsepower, with direct coupled generator. The new furnace is to hold 3970 pounds, and the production is estimated to be at least 1500 tons a year if charged with cold raw material.

Engineer Kjellin said that the steel produced is of superior quality and characterized by strength, density, uniformity, toughness, and the ease with which it can be worked in cold, unhardened condition, even when containing a very high percentage of carbon. Compared with other steel, it also has less tendency to crack or warp when hardened. The reason why this steel in certain qualities differs from other steel, especially in its softness when unhardened, is considered to be its freedom from gases. The manufacture of special steel, with nickel, chrome, manganese or tungsten, will, of course, not meet with any difficulties. The chrome steel and tungsten steel produced at Gysinge has proved to be excellent for lathe tools. When used for permanent magnets, the Gysinge tungsten steel has been found to give stronger magnets than other tungsten steel and has not warped in the hardening.

From estimates made, it has been ascertained that the furnace used at Gysinge, which is simple in construction and easily managed, has prospects of competing, as to cost of operation, with the furnaces heretofore used for fusion of steel, especially as it yields steel of a better quality. For Sweden, with its good ores and large supply of water power, the electric method of smelting steel ought to be of great importance, and abroad, where blast furnace gas is becoming a cheap source of power, it ought to come into extensive use.

After the lecture, Axel Wahlberg made some statements concerning tests of steel ingots from Gysinge, which had been found to be uniform and homogeneous. Microscopic examinations had indicated that there was no difference between the electro steel and crucible steel, which was so much more remarkable as the electro steel in other respects had different qualities.

A New Manufacturing District at Niagara.

The City of Niagara Falls was formed by merging the former village of Niagara Falls and Suspension Bridge and a small section of the town of Niagara into one municipality, and the power development has up to this time been confined in its application principally to that section formerly in the village of Niagara Falls and the town of Niagara. The territory that was known as Suspension Bridge lies to the north, and while it has long been intimated that this section would some day grow to greatness through the power development nothing that would assure this has occurred until within a few days. Now, however, all the brightest hopes appear about to be realized.

When the Niagara Falls Hydraulic Power & Mfg. Company acquired possession of the surface canal in 1877 there was considerable land in the deal, but much of this was sold off, and while a very large block was retained by the company for factory sites, the development of power in recent years has brought so many industries to Niagara that the canal company have seen the necessity of going out on the northeast, or Suspension Bridge side, of the city, and purchasing a large block of land for a new industrial section. Report gives the number of acres so purchased from 100 to 400, and it may be that at this writing the full extent is not known. On the property so purchased the Niagara Falls Hydraulic Power & Mfg. Company will establish a new industrial section, and it is already assured that it will grow rapidly.

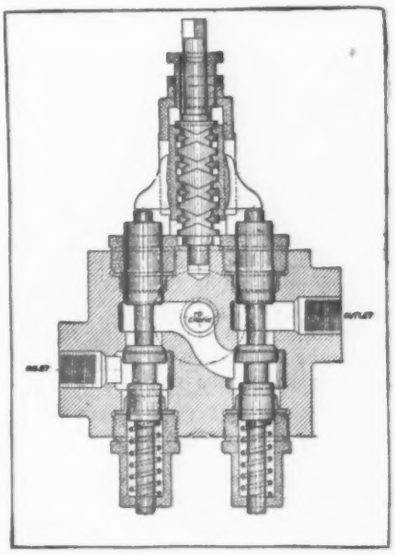
One thing going to show how substantial the movement is is found in the fact that the Carter-Crume Company, manufacturers of the country's supply of counter check books, announce that they have bought 5 acres in the new section, and will at once proceed to erect a factory that will cover over 3 acres. The present plant of this company is located on the lands of the Niagara Falls Hydraulic Power & Mfg. Company on Main street, and while it has considerable room the company's business has outgrown it.

Coupled with this news comes the announcement that when the Carter-Crume Company move to their new plant, the William A. Rogers, Limited, will then occupy the present factory building of that company. Now the William A. Rogers, Limited, have a plant adjoining the Carter-Crume Company, the same capital being interested in the two concerns. It is intimated that when the new quarters are available the William A. Rogers, Limited, will move their plants to Niagara from Northampton and New Bedford, Mass., and also from Oneida, N. Y., in order that the business may be concentrated under a single roof.

The new manufacturing section which will be established by the Niagara Falls Hydraulic Power & Mfg. Company will have excellent railroad facilities, and it will be a comparatively easy matter to transmit power to the section from the company's generating plant. It is considered likely that the company will very soon announce their intention to erect a new power house in the gorge close to the water's edge, a short distance below the present power house. To-day from the several mills now using water from the canal there is considerable waste passing from the wheels to the *débris* slope and then into the lower river. The little waterfalls so formed are picturesque, but it is altogether likely that this scene of to-day will be unknown in the near future, when this waste has been captured to again pass through turbines that will actuate mighty generators in a new power station.

The Public Hydraulic Valve.

The sectional cut shows a three-way Public hydraulic valve for crane service manufactured by Monahan Bros. of Joliet, Ill. The four-way valves are made with four



THE PUBLIC HYDRAULIC VALVE.

plugs or pistons. The operating screw is cut compound with a right and left hand thread, and the nuts are in two and four sections for three and four way valves, respectively. The right hand nut descends while the left hand nut ascends, or *vice versa*, by moving the lever one way or the other. The use of this screw eliminates all slamming of flanges and water hammer, the result being the absence of shock to pipes and connections. It is also practicable to use metallic seats which have a long life. If for any reason the valves become cut, reseating can be done in a few minutes by using a reseating coil, or the old one can be replaced by a new one without disturbing the valve. The leather cups used for the packing plugs will give service for months, as they are subjected to very little wear. The valves are easily operated and balanced. The smallest motion of the lever will reverse them and a piston in a cylinder can be moved fractions of an inch either way and loads held on the crane indefinitely without the attendance of an operator. There can be no leak in the valve which the operator cannot discover.

A New Bag Conveying System

The New Jersey Foundry & Machine Company of 9-15 Murray street, New York, have just completed for the Walter Baker Company, Limited, of Milton, Mass., a conveyor for handling 250 bags per hour, weighing 300 pounds each. The problem in this case was to take the bags from cars on the track at the side of the building to the second floor of a warehouse about 60 feet wide and several hundred feet long. The bags were to be delivered in such a way as to reduce the labor required to stack them in piles to a minimum.

A bag elevator, Fig. 2, is arranged vertically just outside of the building, carrying the bags on sets of curved projecting arms mounted on an endless chain which runs between guides. This elevator receives the bags directly from the car and discharges them into an inclined chute extending into the building to the center bin, and lying wholly above the bottom chord of the roof trusses. The chute leads to a conveyor, Fig. 1, running the full length of the building and carried by trussed frames resting on the bottom chord of the roof trusses. The conveyor has on top a carrying platform made of wooden strips so as to present a practically continuous floor. At either side of the longitudinal conveyor is a cross conveyor, spanning the space from the center of the building to the side walls, and having its carrying platform at a lower level than that of the main conveyor. These cross conveyors form each a self contained structure, running on tracks extending the full length of the building, attached along the side walls and along the center conveyor trusswork. The system of conveyors thus covers the whole space of the loft and permits transferring bags from the elevator to any desired point.

The operation will be readily understood. The laborers in the car toss the bags into a stationary rack placed in the path of the projecting arms carried by the elevator chain. These projecting arms are so spaced as to pass between the bars of the rack, and they pick up the bag and carry it to the top of the building. Here the bags fall into the chute, down which they slide to the longitudinal conveyor, which carries them along to any desired point. The bags are unloaded from the conveyor by inclined guide boards, shown in Fig. 1, which may be fastened at any point, and which shove the bags off onto a short slide leading to the cross conveyor. From the latter they are in turn unloaded by another guide board at the point desired, and by way of a hinged skidboard they slide to their place in the stack of bags. The only manual labor that remains to be done is to slew them around into proper stacking position.

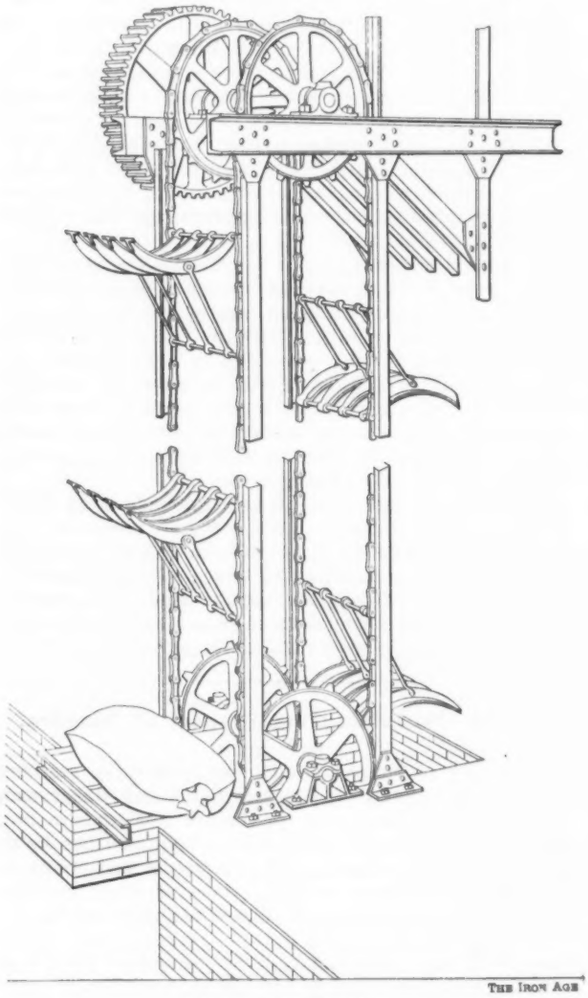


Fig. 2.—Bag Elevator.

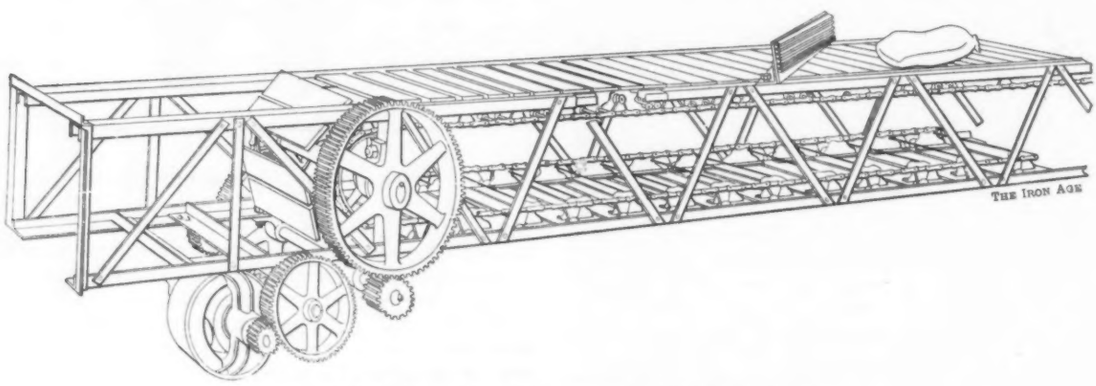


Fig. 1.—End Portion of Conveyor with Unloading Guide Board.

A NEW BAG CONVEYING SYSTEM.

The feature of difficulty in the design of this plant was to so construct the horizontal conveying platforms that the bags could be successfully slid over the side by the stationary guide boards without risk of catching and tearing. Its successful solution makes the plant of particular interest to engineers having to solve conveying problems in which the handling of material in bags is involved. The construction of the horizontal conveyor is clearly shown in Fig. 1. Two light steel truss frames running longitudinally rest on the bottom chord of the roof trusses. Attached to the top longitudinal angle of each of these frames is a Coburn track, in which roll wheels attached by hanger pieces to the conveyor chain. The latter, in turn, carries on malleable iron shelf blocks the wooden strips that compose the platform of the conveyor. Each pair of platform strips also carries horizontal guide wheels, which maintain its alignment by bearing against a longitudinal angle adjacent to the roller track. The carrying wheels of the conveyor chain also support the chain on its slack or return side, bearing for this purpose on a longitudinal shelf angle attached to the lower chord of the truss frame.

The guide board is fitted with projecting strips of

wood running along the face and pitching slightly upward toward the discharging end of the board, the board itself leaning backward a little. The whole construction is intended, in connection with the smooth horizontal surface of the conveyor platform, to prevent the bags being drawn under the guide board when they strike it, and to discharge them in proper manner upon the skidway. The whole machinery is electrically driven.

Worcester Industrial Notes.

Machinists' Strike Ended.

WORCESTER, MASS., July 14, 1902.—The strike of the machinists was formally declared off at a meeting of the remnants of the Worcester Machinists' Union Wednesday night. The vote was practically unanimous, only a few hotheads voting no on the question. Maurice W. Landers of Hartford, Conn., fifth vice-president of the National Association of Machinists, in speaking of the result of the strike, said: "Worcester is a bad city for unions." Mr. Landers has done everything he could to prolong the contest, but seven weeks was the limit. In fact, the bulk of the strikers were already at work in their old places. Many of the strikers have been taken back, and this week "No help wanted" signs will be posted at the doors of the shops where strikes have been on. The F. E. Reed Company and Prentice Bros. Company, who were hardest hit by the strike, are already running practically full again. Inquiries from customers have been received in large numbers during the last week or ten days, and the manufacturers are feeling confident that large business is before them. They have been injured financially by the strike, but are very well content so long as they have won the battle with the union, not only without conceding a single point, but with the result that the Worcester Machinists' Union is practically dead. The employees are delighted that they are at work again. The only disappointed ones, apparently, are the leaders and those whose jobs have been taken by men hired from outside the city during the strike. The men are dropping out of the union, saying they have had all they want of that sort of thing.

Contract Placed for the Deering Steel Plant.

The Deering Harvester Company of Chicago have placed a contract with the Morgan Construction Company of Worcester for a merchant steel mill to be located on the Calumet River, at Chicago. The Deering Company have had difficulty in getting merchant steel rolled to exact size. Some parts of their machines are made of unturned steel, and exact rolling is necessary. Because of trouble experienced in the past the company determined to build a steel plant and merchant mill of their own. Julian Kennedy of Pittsburgh has the contract for the steel plant and blooming mill, the Morgan mills taking the blooming mill product and rolling it into steel of exact diameter for the purposes of the company, which means cylinders almost as perfect as the product of an engine lathe. The Morgan mills have produced this result in other places, and the company feel no anxiety over the work of the new Deering mill. The Morgan Construction Company will also furnish a number of gas producers for the steel furnaces.

Minor Notes.

The American Machine Screw Company, of which the Worcester Machine Screw Company form one of the constituent parts, have decided not to build the big new plant at Detroit as planned. In its place the company will build a considerable addition to the present shops at Detroit. The scheme of the new plant is not abandoned, but postponed for the present. The company report that they are doing an exceedingly large business, and certainly the Worcester shop was never busier than it has been for the past year and more. The McCloud, Crane & Minter Company, the other Worcester machine screw concern, also report business as unprecedentedly good.

The Howard Bros.' Company, manufacturers of card clothing, have let the contract for a large addition to their factory at Worcester. The new building will cover 10,000 square feet of land, and will be four stories and a basement in hight. The material will be brick. The cost of the building will be $40,000. The Howard Bros. Company are independent, their principal competitor being the American Card Clothing Company, the combination of New England card clothing manufacturers, most of whose factories are in Worcester and the neighboring town of Leicester. The Howard Bros. Company have prospered, as is indicated by the building of an addition which will more than double the room. New machinery will be installed and the capacity of the factory greatly increased. The business was established in 1866.

The Lorain Steel Company have a track welding outfit at work in Worcester, on the lines of the Worcester Consolidated Street Railway Company. Already some 12 miles of track have been welded, and the work will continue until the end of the season, the results obtained being such as to induce the Consolidated to continue welding all over the system, so far as possible, where new rails have not been laid within a year or two.

The foundry of Heywood & Wilson, at Fitchburg, Mass., has been bought by Joseph Pereaut of that city, who will conduct it in connection with his other foundry.

The Worcester Surprise Spring Company of Worcester have been incorporated under the laws of the State of Maine, with an authorized capital stock of $40,000. The company will take the business conducted by a firm of the same name, and will manufacture spring beds and iron bedsteads. The officers of the company are: President and treasurer, Bert H. Prior, who with C. S. Yeaw and W. G. Prior will constitute the Board of Directors.

The Spencer Wire Company have added a department for the manufacture of tacks and will devote a portion of their new building to the purpose.

The soft coal situation does not seem to grow serious in Worcester. The quality of the coal received is wretched, but there is enough of it for the present.

The Washburn & Moen Department of the American Steel & Wire Company are almost as busy as before the summer came. The big works shut down July 4 and the next day, that being Saturday, but outside of this little vacation the works are running full time with full force of men. The same condition of business exists at the Morgan Spring Company, Spencer Wire Company and Wright & Colton Wire Cloth Company, and from Clinton the report is that the Clinton Wire Cloth Company are as busy as ever. J. N.

The Holthoff Machinery Company.—The new plant of the Holthoff Machinery Company, at Cudahy, Wis., has been completed and was in active operation July 1, although not to full capacity. The pattern and machine shops will start up gradually and it is expected to have all machines ready and in operation about the middle of the month. The shops have been equipped with the most modern machinery, and special attention has been given to the boiler shop, which is fitted up for manufacturing all classes of boilers and heavy sheet metal work. It is intended to build the internal fired boiler with Morison corrugated furnace, as well as heavy tank work of all kinds. The machines in the shops consist of the following: One Hilles & Jones heaviest plate bending roll, one No. 5 single punching machine, one horizontal punching machine, one small bending roll, one R. D. Wood's sectional flange press, triple power hydraulic riveter, hydraulic 50-ton crane, accumulator, a Lennox rotary bevel shear and splitting shear, 1500-lb. Bement steam hammer, rapid action press, and other small tools to correspond. The company report a large number of orders already on hand.

Catalogues Wanted.—J. C. Boyd, who has recently established himself at Lebanon, Pa., as consulting and contracting machinist, making mill, mine, railroad and blast furnace equipments his specialty, is desirous of receiving catalogues, price-lists, &c., from machinery and supply manufacturers.

Buildings for the National Bureau of Standards.

WASHINGTON, D. C., July 15, 1902.—Within the past week the work of construction of the buildings for the new National Bureau of Standards has been begun on plans which when fully completed will represent an outlay of more than $1,000,000. The two buildings for which appropriations are now available will cost $365,000, but the complete scheme contemplates several additional buildings, for which the appropriate committees of Congress have practically pledged the money when needed.

The first building to be erected will be known as the mechanical laboratory. It will be three stories in hight, 135 feet long and 50 feet wide, and will contain the power and lighting plant, storage batteries, special alternating current machines for experimental and testing purposes, the refrigerating plant, the heating and ventilating plant, auxiliary apparatus, the machine shop and carpenter shop, as well as laboratory for heavy electrical testing, photometry, gas and water meter testing.

In the boiler room two 125 horse-power boilers will be installed, space being provided for doubling this capacity. In the dynamo and engine room, two 80 horse-power high speed engines, each direct connected to two 25-kw. direct current generators with special alternators, The floor space will admit of doubling this power plant whenever necessary.

The latest devices will be employed in the combined heating and ventilating system. The air will be supplied to the various rooms by means of ducts, with the aid of electrically driven fans, the temperature of any room in either building being independently controllable by a thermostatic damper at the bottom of the respective flues, where the heated or artificially cooled air will be mixed with the air from without. The ducts are so proportioned as to permit a complete renewal of air every 15 minutes. In winter the air to be heated will be passed over coils fed with exhaust steam, and in summer will be cooled by coils through which cooled brine is circulated. To cool the air and to provide artificial ice a refrigerating plant of 30 tons ice melting capacity will be installed. Although the building will be used only a portion of the 24 hours, provision will be made for fully utilizing the refrigerating capacity.

An instrument shop will also be contained in this building and will be equipped with the latest types of motor driven precision and engine lathes, milling machines, shapers, drills, presses, &c. A liquid air plant will be installed with a capacity for all experimental needs likely to arise and an electric storage room will be fitted up for heavy current testing. The general equipment of the mechanical laboratory will be designed for power and instrument tests and it is predicted that the demand for this work will increase so rapidly that the additional buildings planned for will be needed within a very short time after the laboratory is ready for occupancy.

The main building, which will include the office of the director of the bureau, and the construction of which will proceed simultaneously with the mechanical laboratory, will be four stories in hight, approximately 150 feet long and 50 feet wide, and will contain about 50 rooms, all equipped with apparatus for verification work and for special investigations, and provided with gas, electric lights, compressed air, suction, hot and cold water, as well as with a number of independent electrical circuits, so that electrical currents of any desired character may be obtained. The importance of temperature control in a physical laboratory has long been appreciated, and it is especially desirable in an institution where standardizing work is to be done, as nearly every result depends at least to some extent upon the temperature at which the measurements are made. Accordingly, means will be provided for closely regulating the temperature of any room at any desired temperature, both in summer and winter.

An important departure in the construction of this building will be the fact that the basement, instead of being given up to heating, lighting, ventilating and power plants, will be utilized solely for the more precise work of the laboratory. Four large rooms will be fitted up in the basement as special temperature rooms, and the entire underground story will be vaulted over so that both the basement and the floor above will be practically free from vibration. The second floor will be set aside for the administrative and clerical work, and for a library and museum in which standards and apparatus of historical importance will be preserved.

A well equipped chemical laboratory will be fitted up on the third floor, part of which will accommodate a laboratory for photometric research. There will also be provided on this floor a lecture room with a seating capacity of 150 or 200. As it will be the policy of the bureau to keep in close touch with the interests it serves, it is hoped that it may soon be in a position to extend invitations to scientific and technical associations to hold their meetings from time to time in Washington.

W. L. C.

Increasing Interest in Drawback Regulations.

WASHINGTON, D. C., July 15, 1902.—Drawback regulations have been prepared by the Treasury Department within the past week covering the exportation of hydraulic jacks manufactured in part from imported seamless steel tubing and of horse nails manufactured wholly from imported Swedish steel nail rods. In this connection it is an interesting fact that the agitation of the subject of liberalizing the drawback laws has served to attract the attention of many manufacturers, not heretofore conversant with the law, to the fact that drawback is obtainable under the present statute under conditions that are quite practicable, with the result that the Treasury Department is in receipt of numerous applications from representatives of a variety of trades. As was recently indicated in these dispatches, the action of the Secretary of the Treasury in approving the proposed liberalizing of the drawback laws, as outlined in the Lovering bill, has served to broaden the views of the experts of the customs division, and applications are being allowed as rapidly as the necessary investigations can be made where the special agents' reports are found to be favorable.

Hydraulic Jacks.

The regulations for the allowance of drawback on the exportation of hydraulic jacks have been prepared upon the application of Philip S. Justice & Co. of Philadelphia, who propose to import seamless steel tubing upon which a duty of 35 per cent. ad valorem is imposed, the drawback being equal to the total duty, less the legal deduction of 1 per cent. It is proposed that the drawback entry shall show the marks and numbers of the shipping packages, the number and size of the jacks therein, and the number of pounds of tubing used in their manufacture, and, furthermore, that, in addition to the usual averments, the merchandise was manufactured in the manner set forth in the manufacturer's sworn statement. The number of jacks exported shall be ascertained by the expert officer, and weights verified by a United States Weigher. In the liquidation of the entries a sworn statement of the amount of imported tubing used in the manufacture of the 10, 15, 20 and 30-ton jacks must be filed with each entry, and as a basis of liquidation the amount of drawback allowed may be that declared in the drawback entry, but shall not exceed 63 pounds in 30-ton jacks, 37 pounds in 20-ton jacks, 32 pounds in 15-ton jacks, and 21 pounds in 10-ton jacks.

Horse Nails.

The regulations for the allowance of drawback on horse nails manufactured from imported Swedish steel nail rods have been formulated upon the application of the Capewell Horse Nail Company of Hartford, Conn., the allowance to be equal to the duty paid on the rods less 1 per cent. The preliminary entry is required to show the marks and numbers of the different shipping packages, their gross weight stated separately for each description of package, and the net weight of horse nails contained in each and in the entire shipment. The gross and net weight of each shipping package must be marked or stenciled thereon. The drawback entry must show the total net weight of horse nails exported and

the weight of imported steel rods consumed in the manufacture. The entry must further show, in addition to the usual averments, that the exported nails were manufactured of materials and in the manner set forth in the manufacturer's sworn statement. In liquidation the quantity of steel nail rods in condition as imported, which may be taken as the basis for allowance of drawback, may equal the quantity consumed as declared in the drawback entry, but in no case shall it exceed the net weight of the exported nails, officially verified, with 12½ per cent. of such weight added thereto to compensate for waste incurred in the manufacturing process.

W. L. C.

The Consolidated Lake Superior Company.

The following interesting statement relative to the so-called "Clergue interests" at Sault Ste. Marie, which is evidently official, appears in the *Bulletin* of the American Iron and Steel Association for July 10:

The Consolidated Lake Superior Company, who conduct large operations on both sides of the St. Mary's River, located principally at the town of Sault Ste. Marie, Ontario, are chiefly a Philadelphia enterprise, having been organized by Philadelphians and the larger part of their capital having been supplied by Philadelphia capitalists. The general offices of the company are in the North American Building, in Philadelphia, where all the financial operations of the company are centered. The various industrial operations controlled by them are directed from the offices at Sault Ste. Marie, Ontario. The Consolidated Lake Superior Company have an authorized capital of $35,000,000 7 per cent. preferred stock and $82,000,000 common stock, and the operations thus far undertaken represent an actual expenditure of about $25,000,000. The company are the parent organization, who own the stock of a number of subsidiary corporations by whom the various industrial operations are conducted. Among these subsidiary interests are the following:

1. Lake Superior Power Company, who own lands and water rights at Sault Ste. Marie, Ontario, with a power canal which yields about 20,000 horse-power, this being supplemented by a second canal on the Canadian side soon to be constructed; 2, the Michigan Lake Superior Power Company, who own the water power rights on the Michigan side and are constructing a canal which will yield over 40,000 horse-power and which will be completed and in operation during the present year; 3, the Sault Ste. Marie Pulp & Paper Company, who operate a ground wood pulp mill capable of producing 100 tons a day of pulp, and also a sulphite mill of about 60 tons a day, both of which are on the Canadian side and operated by power from the Canadian canal; 4, the Tagona Water & Light Company, who supply water and light to the town of Sault Ste. Marie, Ontario; 5, the Algoma Steel Company, Limited, who operate a Bessemer steel plant and rolling mill; 6, the Ontario Lake Superior Company, who, while controlled by the Consolidated Lake Superior Company, are a corporation that own and control a number of subsidiary interests on the Canadian side, among them the Algoma Central & Hudson Bay Railway, which is now under construction northward from Sault Ste. Marie to the Helen and Josephine mines in the Michipicoton district, Ontario, and the Algoma Commercial Company, who conduct extensive land, timber and mineral operations upon the lands granted by the Canadian Government for the construction of the railroad.

Mining operations are being conducted upon an extensive scale at the Helen iron ore mine, which is located about 12 miles from Michipicoton harbor, and the ore is carried on the company's boats to the lower lake ports. In the vicinity of Sudbury extensive mining operations are conducted in the nickel and copper deposits. Smelters have been erected for the treatment of portions of the ore at the mines, while part of the ferro-nickel ore is roasted at the works at Sault Ste. Marie, Ontario, and made into briquettes, which are subsequently smelted into ferro-nickel—a pig iron containing a high percentage of nickel. The steel rail mill, which rolled its first turn on May 5, is now running regularly and is rapidly reaching its full capacity of between 500 and 600 tons per day.

The officers of the Consolidated Lake Superior Company are: President, E. V. Douglas; vice-president and general manager, F. H. Clergue; vice-president and treasurer, T. C. Search; vice-president, F. S. Lewis; vice-president, E. C. Lee; secretary, W. P. Douglas; assistant secretary and assistant to the president, Edward H. Sanborn.

Nickel Steel for Engine Forgings.

BY R. S. TAPPENDEN, QUINCY, MASS.

The principal advantage of nickel steel over ordinary carbon steel for forgings lies in the relation which the elastic limit bears to the tensile strength and elongation, the elastic limit being in a sense the true strength of the metal. The elastic limit of nickel steel is very much higher than the elastic limit of carbon steel of the same tensile strength and elongation, very often 30 per cent. higher, and in some cases as much as 50 per cent. higher. The principal drawback to the commercial use of nickel steel is the first cost of producing it, which in many cases is higher than the cost of ordinary finished forgings.

The United States Bureau of Steam Engineering is using nickel steel very largely in the principal engine forgings, the specifications being for H. G. M. F. tensile, 95,000; elastic, 65,000; elongation, 21 per cent. in 2 inches. These specifications are met and in many cases exceeded at the works of the Fore River Ship & Engine Company, some tests going as high as 74,400 elastic, 110,000 tensile, 21 per cent. elongation.

One virtue of nickel steel is the facility with which a low carbon steel will harden, it being the practice, after a forging is forged and rough machined, to heat it and dip in oil, which hardens it very much; afterward the forging is submitted to an annealing process which removes any strains set up in the metal by the sudden cooling which it receives. Nickel steel, after the first cost of production, is not much more expensive to forge than any carbon steel that runs over 0.40 per cent. carbon, and about the same care is necessary in heating and forging as is required by a high carbon steel.

The market for nickel steel is gradually spreading to the commercial trade. Some of the largest engine builders are using it in work where special strength is required; notwithstanding the increased cost over common steel, it is money saved when we consider the cost of breakdowns and delays.

In cases where strength and lightness are required, the high elastic limit of nickel steel permits of using forgings of much less sectional area for the same strength. When the virtues of nickel steel become more largely known it will most surely be used largely in our merchant marine. One of the greatest benefits derived from its use is the fact that a fracture started is not nearly so apt to increase in size as in common steel or wrought iron. This is due to the great tenacity and strength of the metal.

Nickel steel if properly forged, oil tempered and annealed has a very fine grain, and the fracture, in testing, is close and homogeneous and free from crystalline spots. Nickel steel permits of a very fine finish on polished surfaces, and is free from checks and seams, and compares very favorably with any other composition of either steel or wrought iron.

In forging the ingots the United States Government requires a discard of 20 per cent. from the top and 5 per cent. from the bottom of all bottom poured ingots and a discard of 25 per cent. from the top of all others. The wisdom of this policy is borne out in general practice, as the testing machine shows very quickly when the stock is taken too near the top or bottom of an ingot. Anybody trying to be economical in working up the discard always regrets the attempt, as it soon shows in the quality of material, and inspectors should be extremely careful that the full amount of discard is taken off and not embodied in the forgings.

The Christensen Motor Driven Air Compressors.

One of the most remarkable developments in the recent history of engineering progress is the constantly increasing use of compressed air as a medium of performing numerous and various industrial operations. Pneumatic tools and other appliances for the utilization of compressed air have been introduced into one field after another, with such successful and gratifying results that the advantages of using compressed air for a wide variety of purposes are now fully recognized. The present general use of electricity renders it advantageous to operate air compressors with electric motors. The convenience and economy of this method are apparent when it is remembered that an electrically driven compressor can be operated from any lighting, power or railway circuit that may be available.

To meet the increasing demand for an electrically driven, simple, compact air compressing unit the Christensen Engineering Company, Milwaukee, are manufacturing a complete line of motor driven compressors ranging in capacity from 7½ to 1000 cubic feet of free air per minute. The smaller sizes are made for portable as well as stationary service. The following description of these machines will be of interest to our readers: The type M motor driven air compressor, illustrated herewith, is for stationary continuous service. It is built in capacities from 50 to 1000 cubic feet of free air per minute.

The electric motor and the compressor have been designed to form a compact self contained unit. The air is compressed in the cylinder, shown on the left, by a double acting piston, which is operated by means of a connecting rod, Fig. 3, and steel crank shaft, Fig. 2. The latter is mounted in bearings located within the frame of the machine. This shaft carries on the motor end a helical gear, which is driven by a pinion on the armature shaft of the motor. The entire machine is mounted on a substantial cast iron base. Both the cylinder and the valve heads are water jacketed throughout. The clearance spaces have been reduced to the lowest practicable limit, thereby correspondingly increasing the economy.

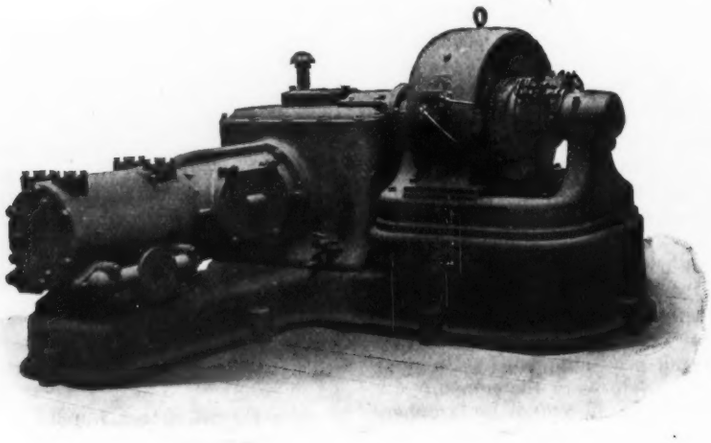


Fig. 1.—Type "M," Motor Driven Compressor.

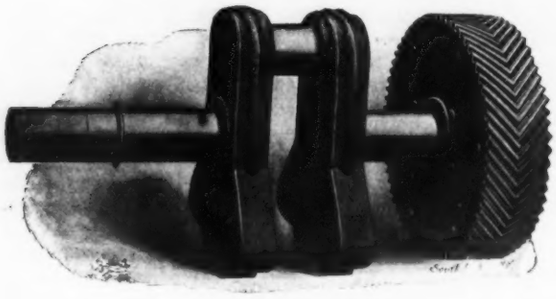


Fig. 2.—Crank Shaft.

The suction and discharge valves are arranged in cast iron heads bolted directly to the cylinder. They consist of seamless cold drawn steel cups, so arranged that each is removable independent of the other. No springs are used with these valves. They are operated by the compressed air itself and are reseated by gravity. The peculiar construction of these valves renders a small lift possible, hence the noise from their operation is reduced to a minimum. The suction and discharge valves are identical and interchangeable. Only one connection is necessary when piping from the compressing cylinder to the reservoir.

The piston, Fig. 4, is provided with an improved form of packing rings, which are carefully fitted in place so that they form as near a perfect sliding joint as can be obtained. The piston rod is of steel, carefully ground true on dead centers. The rod passes through a self adjusting metallic packing box.

The connecting rod is composed of steel and is arranged to receive oil for lubricating the crank pin, wrist pin and piston. The cross head is provided with adjustable shoes of extra large area and with an accurately ground hardened tool steel wrist pin, which fits into a phosphor bronze bearing in the rod. The crank shaft is composed of a high grade steel, and is provided with

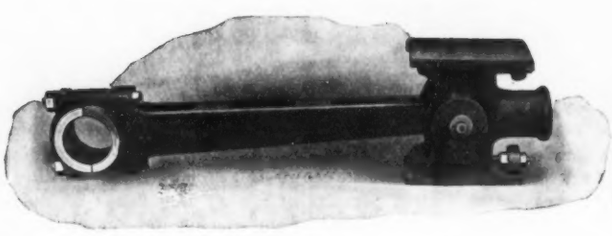


Fig. 3.—Connecting Rod.

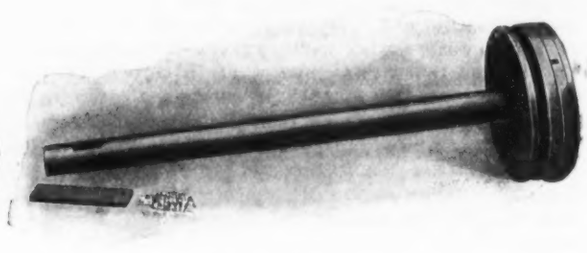


Fig. 4.—Piston.

THE CHRISTENSEN MOTOR DRIVEN AIR COMPRESSORS.

extra large bearings, thus avoiding the frequent adjustment of the bearing boxes which is usually necessary with bearings of ordinary size. The shaft is balanced and accurately turned true to receive the connecting rod. The crank shaft is extended at the motor end to carry the gear. The gear and pinion are of the herringbone type, with teeth cut by special machinery in the most perfect manner, thereby reducing the noise so that it is almost unnoticeable.

The gear case and the crank chamber are connected and form an inclosure, which is partly filled with oil, with which all the working parts are automatically and continuously lubricated, including the air cylinder. The latter is connected with the oil chamber, so that the proper quantity of oil for lubricating the surface between the cylinder and the piston is automatically supplied and no sight feed lubricator is required. The motion of the crank shaft in the oil causes continuous lubrication of the main bearings, the crank pin bearing of the connecting rod, the cross head guide, the piston rod, the wrist pin in the cross head and the piston. Oil is also supplied automatically to the bearings at the pinion end of the motor. The gear and pinion operate continuously in the oil bath. The machine will remain lubricated as long as the oil is kept up to a level determined by a filling plug on the side of the crank chamber. Experience has shown that after being supplied with oil the compressor runs for several weeks before replenishing is necessary.

Either an alternating or a continuous current motor may be used. The illustration shows the continuous current multipipolar type that the Christensen Company build for this service. The lower frame of the motor is of cast iron, and the field is composed of low carbon cast steel with detachable steel pole pieces. The motors are series wound, and are started and stopped without using resistance of any kind. The armature is of the ventilated type, built up of disks of soft steel and slotted to receive the winding. Machine formed armature coils are used. The commutator is built up of hard drawn bars insulated from each other by segments of mica. The armature shaft revolves in extra long bronze bearings with ring oiling arrangement. The bearings are so designed that it is impossible for oil to get into the armature. The brush holder is provided with an instantaneous tension adjuster arranged so that the tension can be increased while the motor is running.

The design of the motor and compressor is such that every part is easily and quickly accessible. By unscrewing a few bolts the armature and the field coils can be removed or exchanged. The gear, pinion, valves or cylinder heads may also be removed without disturbing any other parts. Access to the cross head and wrist pin is obtained by doors conveniently arranged on the side of the slide frame. The crank chamber is constructed so that it is completely closed, but the upper part may be quickly removed, giving free access to all the working parts, while a smaller hand hole covering is provided and may be easily removed for inspection of the interior.

An automatic governor starts and stops the compressor at the desired minimum and maximum pressures. It is a simple piece of apparatus, consisting of an ordinary pressure gauge mechanism with a special hand which, upon coming in contact with a conducting stud at the position of minimum pressure, allows current to flow through a magnet coil. This coil operates a plunger to which the contact pieces for the motor circuit are attached, thereby closing the circuit and starting the motor. As soon as the pressures reaches the desired maximum the hand strikes another stud and current passes through a second solenoid magnet, thereby pulling the plunger in the opposite direction and opening the motor circuit. By this mechanism it is possible to get a close margin between maximum and minimum pressures. This margin is readily adjusted by moving the contact studs. The governor is provided with a magnetic blow out for extinguishing the arc and preventing the burning of the contact pieces.

The business of James E. Brooks, consulting engineer, 45 Broadway, New York, has been incorporated under the name of the James E. Brooks Company for the purpose of adding to the working capital to take care of their increasing business and to give the department heads an opportunity to hold an interest in the business. The company make a specialty of steel construction.

The Production of Mica.

The Domestic Supply Much Below the Country's Requirements.

WASHINGTON, D. C., July 15, 1902.--The United States Geological Survey has completed the report upon the production of mica in the United States in 1901, compiled by Joseph H. Pratt, from which it appears that the total output of sheet mica during that year was 360,060 pounds, valued at $98,859, and of scrap mica 2171 short tons, valued at $19,719. In 1900 the production of sheet mica was 456,283 pounds, valued at $92,758, and of scrap mica 5497 tons, valued at $55,502. Mica has been found in many of the States, but in 1901 was only produced in New Hampshire, New Mexico, North Carolina and South Dakota, by far the larger amount being obtained from North Carolina.

The relatively small production of mica can be accounted for by the low prices maintained for plate mica, by the uncertainty of the occurrence of the mica in the veins, and by the large number of small producers who are entirely dependent upon one small mine, and who, when the mica in this begins to give out, or is poor, have not the means to carry on much dead work, and have no other deposit to help fill out this deficiency. The importation of mica from Canada and India at a low valuation tends also to curtail the production of mica in the United States. This is especially true of the mica imported from India, which can be mined and landed in this country at a lower price than, in some cases, it can be mined for in the United States.

There has been a decided decrease in the use of mica for cutting into sheets of the various sizes which are used for stoves, chimneys, incandescent lights, &c.; but there has been a large increase in the quantities of the smaller pieces of mica that are cut by machinery into small circular disks 1 inch in diameter, and into rectangular pieces ¾ inch by 2 inches, which are used for insulation purposes and for electrical apparatus. Some of the small clear pieces of mica from the cutting of the large sheets are split very thin and rearranged and cemented and firmly pressed together, forming large sheets, which are then cut into the various shapes and sizes desired. Sheets made in this way are known as micanite. For some purposes these large sheets of micanite answer fully as well as the natural sheets, and are, of course, much cheaper. The waste or scrap mica which is not suitable for any of the above purposes has a value, when ground, in the manufacture of wall papers, lubricants, &c.

Another use for scrap mica that has been devised during the last few years is in the manufacture of covering for boiler tubes and steam pipes in general. The scraps of mica are not ground, but are broken to approximately the same general dimensions, about ½ x ¼ inch. These pieces of mica are arranged with their longest direction and face parallel to a wire net coil, and then pressed into the shape of the pipe or tube, the layer of mica being kept tightly in place against this coil by means of heavy canvas. This kind of boiler tube covering can be made cheaply. The commercial value of this scrap mica, which is from $8 to $10 per ton delivered at the railroad, has made it possible to work some of the mica mines that would otherwise have been unprofitable, for in some cases the waste scrap mica represents 75 to 95 per cent. of the mica obtained.

The production of mica in 1901 in detail was as follows: New Hampshire, 65,800 pounds of sheet mica and 255 short tons of scrap mica; New Mexico, 3100 pounds of sheet mica and 140 tons of scrap mica; North Carolina, 266,160 pounds of sheet mica and 1775 tons of scrap mica, and South Dakota, 25,000 pounds of sheet mica; total, 360,060 pounds of sheet mica and 2171 tons of scrap mica. Idaho, Maine, Nevada, Rhode Island

and Virginia, which were producers of mica in 1900, had no production during 1901, and of the other States, with the exception of North Carolina, there has been a very noticeable falling off in the production. In North Carolina there was a decided increase in the production of plate mica, but a large falling off in the production of scrap mica. Extensive development work is being conducted by the Union Mica Company at their property on Black Mountain, near Rumford Falls, Maine. The vein as exposed carries a large percentage of mica; little of it, however, is suitable for cutting into plate mica, but will be used as scrap. Development work is also being done near Oxford, Maine, and North Sherburne, Vt., and all these localities will probably be producers in 1902.

Nearly all of the mica imported into the United States is obtained from India and Canada, by far the larger proportion being from India, and since 1897 there has been a constant increase in the amount of mica entered for consumption in the United States. Under the new classification made necessary by the Dingley Tariff act in 1897 imported mica is designated as "unmanufactured" and "cut or trimmed," and a specific duty of 6 cents per pound is imposed upon the former and 12 cents per pound upon the latter, with an additional 20 per cent. ad valorem on each. The imports for 1900 and 1901 were as follows:

1900.—Unmanufactured, 1,892,000 pounds, valued at $290,872; cut or trimmed, 64,391 pounds, valued at $28,688; total, 1,956,391 pounds, valued at $319,560.

1901.—Unmanufactured, 1,598,722 pounds, valued at $299,065; cut or trimmed, 78,843 pounds, valued at $35,989; total, 1,677,565 pounds, valued at $335,054.

W. L. C.

Pacific Coast News.

SAN FRANCISCO, CAL., July 7, 1902.—The crops being gathered in are among the largest ever garnered here and our only trouble is in a lack of labor to gather them in, though as high as $2.50 per day is being offered for fruit picking, and even at this hands cannot be had. The various hardware, iron and steel houses are probably doing more than their share of the general business, and they will have a big rush after the harvest and vintage are over. Every one is encouraged by the results of the past half year, and it is universally conceded that those of the coming half will be much the largest.

The demand for nails, barb wire and structural iron was never equaled in this State at any previous period in its history. As to structural iron, we can in no way get enough of it, and this fact is directing the attention of many capitalists seriously to the many schemes that have been projected for the establishment of a steel plant somewhere on the shores of the bay of San Francisco. The ore we have in abundance, and in these days of big capitalization the expenditure of a score of millions to bring the ore to tidewater here would be looked upon as a mere bagatelle. The use of oil has entirely revolutionized things. Most of our foundries, machine shops, shipyards, &c., use it now, and it has for more than a year been used successfully in the production of copper from copper ore right at home here. Our Eastern manufacturers will have to look well to their laurels.

The number of buildings put up in this city or contracted for during the past six months has been nearly double that for the same time in 1901, and the figures of last year were larger than for any other year since 1892-93. The figures for the six months of the present year were 1289, against 764 for the same time in 1901, and the value $7,426,083, against $4,090,955 for the same time in the former year.

Our export trade in iron and steel is now made up principally of machinery, engines, bicycles, pipe and typewriters for China, Japan and Australia. For the Australian colonies the "Sonoma," which cleared on July 3, took out an unusually large consignment of sewing machines—160 cases, valued at $2595, for Australia, and 12 cases, valued at $102, for New Zealand. The same steamer had machinery valued at $9930 for Australia and $4341 for New Zealand, or $14,271 altogether. She also had bicycles valued at $1635, as a rule for Australian points, besides $1150 in hardware for Australia. The shipments of machinery and pipe to the Hawaiian Islands of late have been very large, and as the prospects of the sugar planters are improving they will be larger. No less a scheme than the capitalization under one management of all the large plantations in the islands is talked of, and should that take place there will be an unprecedented demand for machinery, pipe, railroad iron, &c.

I here give the exports of articles of iron and steel manufacture from this port to the Philippines in 1901:

Agricultural implements	$133
Bicycles	13,834
Instruments, electric	5,736
Instruments, various	9,750
Printing presses	1,082
Nails, 40 kegs	120
Stoves	1,354
Tools	3,276
Pipe, &c	9,861
Locks	301
Pumps, &c	2,195
Boilers, &c	3,154
Safes, 9	1,232
Castings	9,790
Electric machinery	1,230
Cutlery	364
Sewing machines	244
Cash registers, 3	387
Typewriters	134,959
Wire, 10,340 pounds	370
Machinery	28,434
Bar iron, 14,000 pounds	405
Scales	330
Steel, sheets and plates, 42,000 pounds	1,300
Saws	149
Firearms	178
Hardware, various	11,985
Total	$242,153

J. O. L.

The Minnesota Steel & Machine Company.—The Minnesota Steel & Machine Company of Minneapolis, Minn., who were recently organized with a capital of $500,000—formed by the merging of three companies—namely, the Barrett & Record Company, the Twin City Iron Company and Gillette-Herzog Mfg. Company—have begun the erection of their new plant at South Minneapolis. The plant will consist of a machine shop, foundry, office building, steel and structural shop, storing shed, boiler room and barn, which buildings will alone cost $94,800. The amount to be invested in the entire plant is said to be $350,000. Several buildings of the old harvester works plant will be remodeled and used for storage purposes. The main building will be entirely new and of the latest pattern; in the office building provision will be made for a large restaurant in the basement. They report the work progressing satisfactorily and expect to have a large portion of the plant in running operation by January 1. The officers of the company are J. L. Record, president and treasurer; O. P. Briggs, vice-president, and Ralph P. Gillette, secretary. Joseph Garbett is mechanical engineer.

Business men of Seattle, Wash., headed by E. C. Hawkins, civil engineer, Dexter Horton Building, are organizing the Ætna Locomotive & Machine Company, for the building and repairing of locomotives, freight cars and machinery, principally for logging purposes and the manufacture of iron castings. The company have purchased 30 acres of ground at Ballard, where they intend to erect a $300,000 new plant, to consist of machine and boiler shops, foundry, blacksmith shop and car works. Plans are not yet completed, but they expect to be able to begin the work of construction within the next month. The capacity will be about 72 locomotives, 900 freight cars and 500 tons of castings per year. E. C. Hawkins will be president, and George J. Danz of W. D. Hofius & Co., secretary and treasurer, who with the following will comprise the Board of Directors: W. D. Hofius, William Pigott, Moritz Thomsen, D. A. Robinson and J. F. Howie.

Notes from Great Britain.

Sir C. Furness as a "Littery Gent."

LONDON, July 5, 1902.—The impressions of the numerous investigators who have recently been touring through the United States iron and steel centers have come home to roost in the shape of newspaper articles and books. A fortnight ago I sent some account of the report of the Commission of the British Iron Trades Association. There has now reached me from the publishers, Simpkin, Marshall, Hamilton, Kent & Co., 16 St. James street, Haymarket, London, S. W., a *brochure* by Sir Christopher Furness, M.P., entitled "The American Invasion." The prevailing note of this little book is one of hopefulness for the future of British industry. While not undervaluing the strength of the American invasion, Sir Christopher by no means despairs of the future of his own country. In the preface he says:

"I repeat that in my opinion there is no reason to think England's commerce is in a state of decadence. There is an enormous amount of capital here for investment—to stimulate, foster and support the inventive powers, the industrial and commercial enterprise of the people. We have men of great ability, knowledge and experience in all branches to lead, advise and instruct us. Englishmen have the opportunity of being educated at a moderate cost, and, above all, I trust and believe, still possess those qualities of indomitable perseverance, intelligence, practical wisdom and that spirit of adventure and capacity for work which have built up our Empire."

But Sir Christopher is not blind to the difficulties and deficiencies which beset the path of British industry. Very significant is his warning to the "gentlemen of England":

"I am not the man to support any wild and revolutionary theories of confiscation, but the mineral rents and royalties of this country are undoubtedly excessive, and I would warn the 'gentlemen of England' that property has duties as well as rights, and that if while shirking those duties they impose on trade and industry burdens grievous to be borne, which they themselves touch not with one of their little fingers, they will only have themselves to thank should such theories become more and more popular."

The writer is here specifically referring to the inequitable rating as between industry and the royalty owners, but he writes with considerable force and feeling upon the whole question of mining rents and royalties. I shall recur to this subject in a moment. Meantime let us take note of some other points made by Sir Christopher. He is loud in his admiration of the American system of education. He was struck with the large number of highly educated men devoting themselves to business; nor could he fail to contrast this with the sons of wealthy Englishmen, who seem consistently to turn away from business. "Trade in America is esteemed as a calling; here it is looked upon as a means to a life devoted to games and sport and to entering a circle of social distinction." True; but are wealthy young Americans quite so industriously minded as Sir Christopher would have us infer? It is when we get to the third and fourth generations that we really discover to what extent habits of industry persist. On that point, I imagine, we shall see what we shall see. Our mentor is on firmer ground when calling loudly and emphatically for more technical education. He drops into a very pretty little epigram: "The eloquence of Demosthenes may have affected Philip, but it would not have perfected the Davy lamp." But these epigrams are dangerous; we had better pass on. After saying some nice things about American business men, Sir Christopher gets to what is really the kernel of his argument. He is greatly disturbed lest Great Britain in her fright should resort to Protection. He sees the poison being subtly instilled into the blood of young Englishmen. In a nutshell this is his argument:

"I contend that protection in England would not pay commercially. To illustrate: We still hold the fort in shipbuilding. What is shipbuilding? It is the bringing together and working up in Great Britain of raw material obtained at the lowest price from different parts of the world, which operation involves a large expenditure of wages. The steel in steamers is made from ore produced in Spain, Algiers and Sweden; the brass from Spanish and American copper; spelter is produced in Germany and tin obtained from Asia; the wood work is made from lumber imported from Sweden, Russia, Canada, America and our colonies; the paint from Spanish, Australian and American lead; the rope from Russian and Manila hemp. Now, to build a steamer at a satisfactory price, and to pay the immense wages bill, these articles must be bought at the lowest possible price. If Parliament, with the object of protecting English lead, iron, copper and tin mines, British forests, &c., were to impose import duties, the cost of the steamers would be increased, the demand would fall off, and the amount distributed in wages would be materially reduced and the whole community would suffer."

Sir Christopher Furness cites the case of the Philippines as a conclusive argument against protection. He points out that Great Britain still maintains there her old commercial predominance. The figures on this point are certainly definitive. But what would be the result with a strong American mercantile marine? I have repeatedly urged in these columns upon Americans the immense importance of cultivating the Oriental trade. Perhaps Sir Christopher's argument may act as a further stimulus to America in this regard. Finally, I may mention that Sir Christopher adopts a very sympathetic attitude toward trades unions. Their best claim to sympathy appears to be, in his opinion, that they have saved Great Britain from the curse of political strikes and anarchical and destructive movements. But "neo-unionism" tyranically opposes the introduction of labor saving appliances and machinery, and by "oppressive and restrictive edicts" hampers trade, increases the cost of production and is really an insidious and suicidal form of protection. The book, generally speaking, is an interesting index to the mind of one of England's greatest and most progressive capitalists—one who concerns himself in all activities relating to iron and steel.

Mining Rents and Royalties.

J. Stephen Jeans, in his report on the American iron and steel industries, upon which I have recently commented, does not attach great importance to the question of mining rents and royalties as a factor in Great Britain's competitive efficiency. Sir Christopher Furness, on the contrary, does. It is not for me to measure the comparative authority of these two gentlemen. A few words on this topic may help to clarify the situation. Sir Christopher Furness refers in some detail to a pamphlet by C. M. Percy, lecturer at the Wigan School of Mines. This pamphlet was published in 1890, but is quite up to date for all practical purposes. It is really an analysis of the evidence given before the Royal Commission on Mineral Rents and Royalties. One broad conclusion reached is that the average royalty on coal equals 8 pence (16 cents) on all coal mined in the United Kingdom. Sir Christopher Furness estimates the amount of royalties and rents on mineral products at £6,000,000 per annum. Sir Charles Mark Palmer, M. P., one of the Royal Commissioners, said that he knew one colliery in Northumberland which, on an output of 650,000 tons a year, paid a royalty of 10 pence (20 cents) per ton, or upward of £27,000 per annum. C. M. Percy attaches great importance to what he terms "overpaid rents"—that is, rents paid for minerals which, by reason of causes beyond their control, the owners cannot work during the term of their lease. Two cases are cited: An exceptionally well managed colliery firm in Lancashire have paid over £300,000. Another Lancashire firm went into liquidation, having paid £80,000 in overpaid mine rent. The same authority states that in 1890 "the actual amount now standing as overpaid mine rents is certainly hundreds of thousands, and it may be even millions of pounds." The royalties on ironstone may be anything from 2 shillings 6 pence (60 cents) to 6 pence (12 cents). A statement made by John Dennington, secretary to the Cleveland Mine Owners' Association, is succinctly summarized by C. M. Percy. In 37 years, ending 1886, the total output of ironstone for the Cleveland district reached 130,909,946 tons. The royalties paid

amounted to £3,000,000. From this 40,000,000 tons of Cleveland pig iron was made, on which the total amount of royalty paid on the ironstone and on the coal (including limestone at 6 cents a ton) reached £6,000,000. The decade ending 1888 was a time of serious depression. During that period wages were low and profits hard to seek, yet royalty owners received upon coal, ironstone and limestone not less than £6,000,000. Adding insult to injury, the royalty owners got off almost scot free from local rating burdens. There is a special act of Parliament empowering ironstone workers to deduct one-half of all local rates from mine royalties, but this act does not apply to coal mines.

Royalties in France and Germany.

A comparison with France and Germany "gives, furiously to think," as our Gallic neighbors would say. In Germany the ownership of coal is vested in the State; so also is iron ore. The State royalty is fixed at 2 per cent. on the profits of the undertaking, while there is no royalty on iron ore. In France the same principle of State ownership prevails. The royalty is based upon 5 per cent. of the profits. Assuming a profit of 2 shillings per ton upon coal, the Englishman pays 8 pence (16 cents) per ton, the German ½ pence (1 cent); the Frenchman 1¼ pence (2½ cents). But the Englishman pays royalty, profits or no profits, the Germans and French do not. Comparatively these royalties work out thus:

	France.	Germany.	England.
	s. d.	s. d.	s. d.
Pig iron, per ton	0 8	0 6	4 6
Ship plates	1 1½	1 0	5 9
Steel rails	0 11	0 8½	5 6

In the face of figures such as these it seems to me evident that mineral rents and royalties will undoubtedly constitute an important competitive factor. Of course, they are in force in the United States, but a vastly larger proportion of American coal and ore workers own absolutely their own mines and consequently their royalties really enter into capital cost.

Rumored Amalgamation.

It is stated on good authority that negotiations are in progress between the Krupp and Ehrhardt companies on the one hand, and the Ansaldo Company of Genoa upon the other, with a view to the joint working of the various establishments. The Milan correspondent who makes this statement says that nothing is yet known as to the likely terms of the agreement, but since the Ehrhardt Company, backed by Krupp and other influences, have been invading Italy, it is believed that the Ansaldo Company were approached in the matter, and that they may therefore be expected to make a very satisfactory arrangement.

Losses on Steel.

I have already referred to the depressing balance sheet of the Ebbw Vale Steel, Iron & Coal Company. Joseph Brailsford, the chairman of the company, attributes the loss on steel to the German commercial crisis. The importation of German steel hit the company very hard. I venture to quote some remarks made by Joseph Brailsford at the annual meeting of the company, as they show very vividly the anxious time always inevitable the moment foreign competition shows itself:

> While the Ebbw Vale Company were receiving their usual installments of raw material, under contracts entered into months earlier, large parcels of finished steel, billets and bars, which constituted their staple manufacture, were landed at Newport at prices at which it was impossible either for their company or any other manufacturers of the same material to compete at a profit. The average fall in finished steel (he was speaking of heavy rails, billets and tin bars) for the year 1901, as compared with the market price for the September quarter, 1900, was, broadly speaking, £2 per ton, whereas the fall in the price of raw material during the same period was altogether disproportionate, and not equivalent to one-half of that amount. That was the situation that had to be faced. The directors had to decide whether it was better to continue manufacturing so as to keep the works going or to close down the steel works for a short but necessarily a more or less indefinite period rather than manufacture at a loss. The general manager, who had had a very anxious time, and who had done his loyal and level best to meet the difficulties of the situation, was of opinion that it would be better to keep going rather than close, even for a temporary period. This advice was confirmed by the Works Committee of the board, and the directors, after serious consideration, decided to adopt it. The trouble lasted longer than was anticipated, but in the result the advice of the general manager was justified, for in the later months of the year competition to a large extent fell away, there was a distinct improvement in prices, and the works became fully employed, with a consequent and immediate reduction in the working cost. The steel works were fully employed to-day. He would not say they were making any great amount of money, but after the experience of the last 12 months it was some satisfaction to feel that they were carrying on this department at a profit. The loss sustained had been considerable and had absorbed a very large proportion of the profits earned by the collieries. There was, however, no doubt that had the directors been driven to close the steel works, the loss entailed in so doing, the upset involved and the enormous expense attendant upon reopening would have been still more serious.

But these comments mean, if they mean anything, that the Ebbw Vale Company cannot make steel on a competitive basis. I fear there are other firms in the same predicament.

The Tredegar Iron & Coal Company.

The neighbors of the Ebbw Vale Company, known as the Tredegar Iron & Coal Company, did not imitate them, but promptly closed down their iron plant. They had considerable stocks in hand, and sold them at a very fair profit. The company thinks, however, that it is perfectly useless to make iron and steel up in the Welsh Hills and compete with concerns in Middlesbrough and Cardiff, where the ore is sent to the blast furnace exship. The result of this policy is that the Tredegar Company are now practically a coal concern.

S. G. H.

The Fort Wayne Steel Foundry Company.—Capitalists of Fort Wayne, Ind., have organized the Fort Wayne Steel Foundry Company, with a capital stock of $200,000, practically all of which has been subscribed. The company have secured a 15-acre site within easy access of all of Fort Wayne's eight railroads, upon which they will erect a steeel casting plant, the main building of which will be 100 x 480 feet, equipped with four traveling cranes, 30 and 20 tons respectively. Two 20-ton acid furnaces, one 25-ton basic furnace, one or two cupolas and a charging machine will be installed. They may adopt the Tropenas process. Ground will be broken for the buildings within the next two weeks and it is expected that the plant will be ready for operation by January. At the head of the enterprise is G. Max Hofmann, general superintendent of the Fort Wayne Gas Company, who with the following comprise the Board of Directors: Charles S. Bash, William Stephan, J. R. Sinclair, E. H. Coombs, John B. Reuss, John W. White, Charles McCulloch and Louis Fox.

The Atmospheric Products Company of Niagara Falls have broken ground for their first building on the lands of the Niagara Falls Power Company. It will be used as the construction plant for the apparatus to be used by the company in equipping their contemplated large factory on the lands of the same power company. Within a short time the Atmospheric Products Company will start their second building, which will be the first factory in which products are to be manufactured from air as the raw material, the company having accomplished the fixation of nitrogen, as has already been recorded in *The Iron Age*. This second building will be 500 feet long and 50 feet wide, and it is in this building that the apparatus to be manufactured in the first building will be installed.

It is reported that the American Sheet Steel Company have placed a contract with Kelley, Walker & O'Neil for putting in 20 new gas wells in the fields surrounding Indianapolis. The gas plant at Muncie is very much in need of a larger gas supply, and it is said that the company will not be able to operate this coming winter if the supply is not increased. They have a pumping station at Bethel, but the supply is inadequate to meet their requirements. The contract for the wells is estimated at about $20,000.

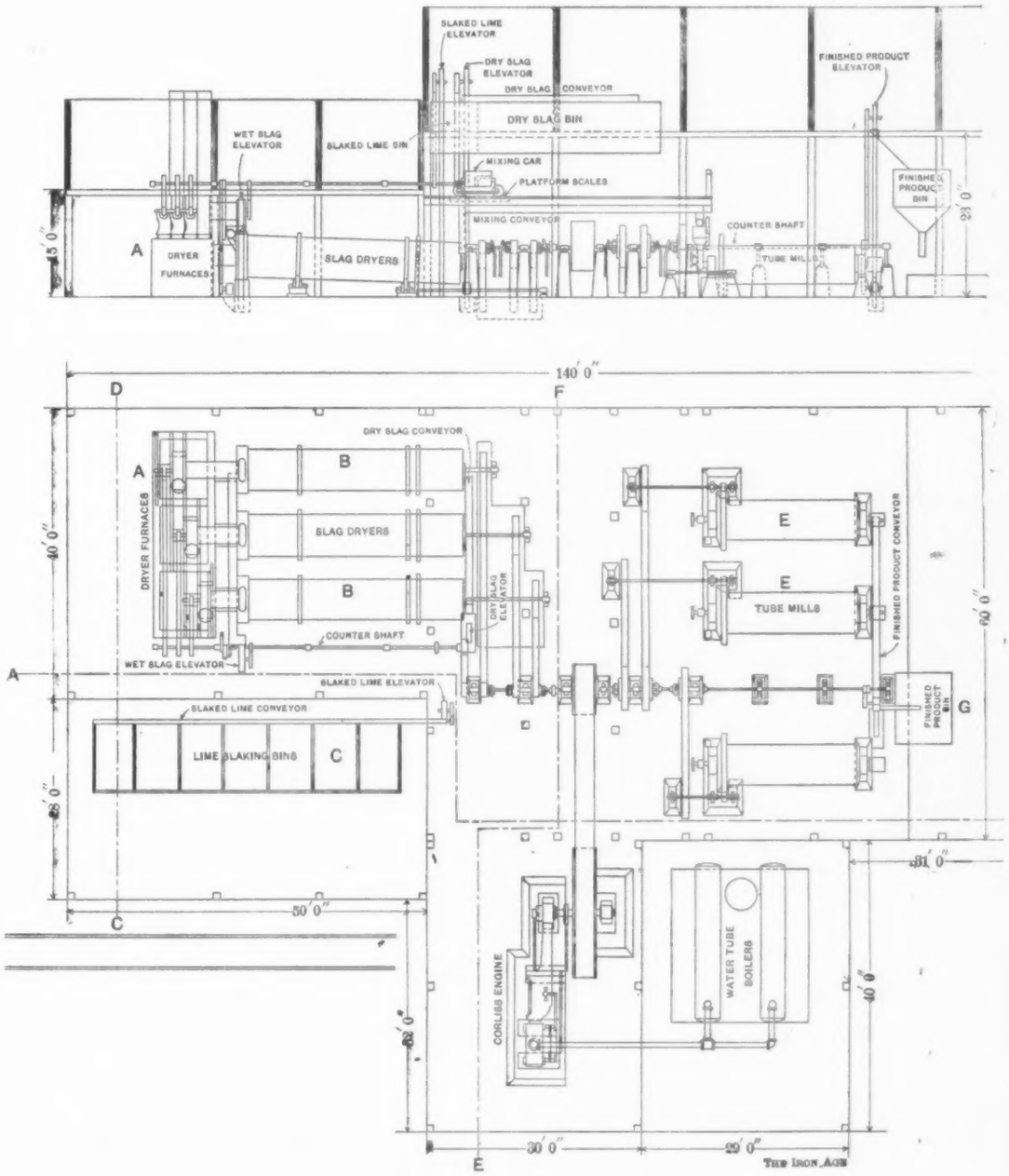
The new plant of the American Radiator Company in Buffalo is expected to be ready for occupancy in

September. It will be operated wholly by electric power from Niagara Falls, the company having a contract with the Cataract Power & Conduit Company for 315 horse-power. The plant comprises six buildings, the largest of which, the foundry building, will cover an area 200 x 300 feet. One roof will cover the six buildings. This roof will be one of the largest bridge steel roof constructions in Buffalo, covering an area of 150,000 square feet. The plant will manufacture house boilers of the type used in connection with the heating

The Manufacture of Cement from Slag.

The Curtin Process.

The utilization of waste products has for a long period attracted attention and gradually those materials are finding a sphere of usefulness. Products which are of such little value as to be practically worthless, and which, not infrequently, have incurred expense in their



Figs. 1 and 2.—Sectional Elevation and Plan of Stewart Cement Plant.

THE MANUFACTURE OF CEMENT FROM SLAG.

of residences, schools, hotels, &c. No radiators will be manufactured in this plant, it is said.

Dr. William B. Phillips, professor of Field and Economic Geology of Texas and director of the survey, has transmitted a report on the coals, lignites and asphalt rocks of that State.

Out of about 65,000 tons of steel required for the New York subway, about 35,000 tons have now been delivered.

handling or disposition, have accompanied the introduction of every new industry, and have been particularly prominent in those undertakings which manufacture from raw materials. The disposition of the slag resulting from the blast furnace has always been a serious problem and is now of greater magnitude than ever before. Natural dumping grounds are being rapidly filled, the railroads require no more ballast and often charge for hauling away the refuse. This charge, in the aggregate, is large and constitutes an essential handicap. At the present time the only outlet for cer-

tain qualities of slag appears to be in the manufacture of cement.

For the past 11 years C. J. Curtin of 39-41 Cortlandt street, New York, has been interested in the development of the slag cement industry and the installation of plants for the manufacture of this cement. Six plants are now in successful operation at different furnaces and several more are under contract or in contemplation.

Slag for making cement must contain less than 1% per cent. of sulphur and less than 3 per cent. of magnesia. A greater proportion of either of these elements ruins the product. Further, a pure limestone must be used in the furnace; the presence of dolomite is also injurious.

The Stewart Cement Plant.

The accompanying drawings represent the slag cement plant now in course of erection at the works of the Stewart Iron Company, Limited, of Sharon, Pa. The plant is being built in accordance with the plans of Mr. Curtin, the Ruggles-Coles Engineering Company of 39-41 Cortlandt street being the consulting engineers. It will have a capacity of 500 barrels per day.

The slag is first granulated at the furnace by meeting while hot a jet of water. At the cement works it first passes through the dryers A B, Figs. 1 and 2, then goes to the mixers C, where a certain amount of lime is added. From here it passes to the tube mills E, where it is crushed to an impalpable powder. After this it is carried to the storage bins ready for packing in bags or barrels.

Drawings of the Ruggles dryer are presented in Figs. 5 to 8. The dryer consists of two concentrically arranged steel cylinders, placed one within the other, the smaller being 30 inches in diameter and the larger 69½ inches. These are placed at a slight inclination to the horizon, as shown. The gases from the furnace enter at A, pass through the inner tube to the opposite end, enter the annular space between the two shells and pass out through the stack at the end they entered. The slag enters the annular space at the end A and after passing through this emerges from the opposite end. It will be noted that the hottest gases enter at the end of the inner tube and give up their heat in their passage through this. Their return is in direct contact with the slag in the annular space. This arrangement utilizes the heat to the maximum.

The dryer is provided with two circular tracks I, which run upon the guide rollers G. It will be noted that these rollers, Fig. 7, are mounted in pairs, which are free to swing about an axle so as to accommodate themselves to any inequalities in the track. The dryer is revolved by the pinion K engaging with the encircling gear J. The rollers L, Fig. 5, are provided with thrust bearings which serve to keep the shells in proper place.

The tube mills which crush the material consist of heavy revolving shells in which are placed flint pebbles. The slag as it passes slowly through these is reduced to a powder.

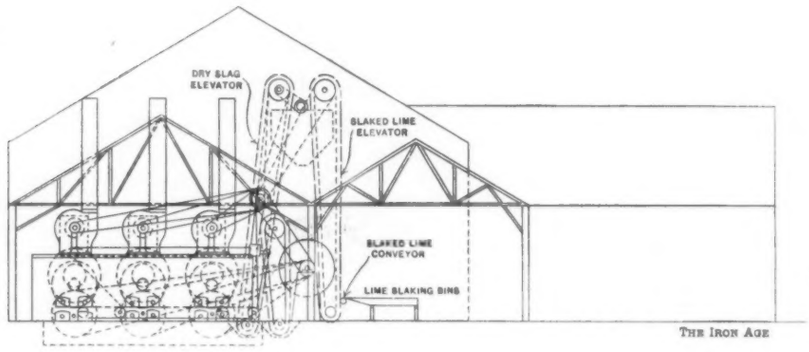


Fig. 3.—Section C D of Fig. 2.

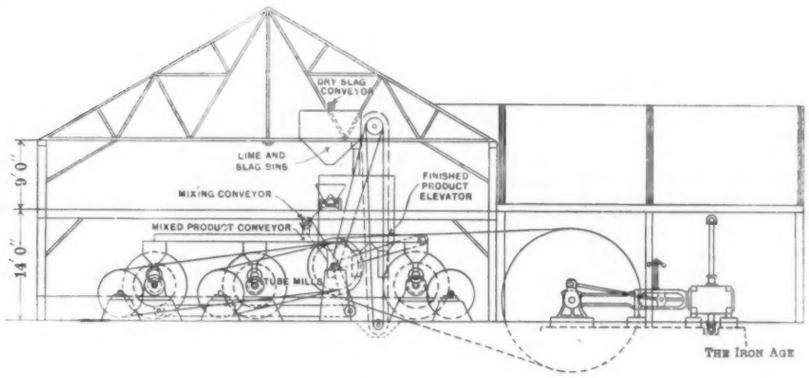


Fig. 4.—Section E F of Fig. 2.

THE MANUFACTURE OF CEMENT FROM SLAG.

Quality of Slag Cement.

In its quality slag cement made in accordance with Mr. Curtin's process ranks with the average American Portland cements, and is now being used in competition with such brands whenever it can be secured. It is applicable wherever the Portland can be applied, except for sidewalk work. It is equal in efficiency to the best cements for cisterns, foundations, sea walls and work where the atmospheric conditions are similar.

The Great Lakes & St. Lawrence Transportation Company of Chicago have awarded contracts to the American Ship Building Company for the construction of ten steel steamships to navigate between the upper lakes and Quebec. The vessels are to cost $2,000,000, and are to be completed and ready for use at the opening of navigation in 1903. The closing of these contracts fills up all the available space in the lake shipyards of the American Ship Building Company.

Central Pennsylvania News.

HARRISBURG, PA., July 15, 1902.—The managers of the works in this part of the State predict that the settlement of the coal strike and its attendant troubles, the greatest of which is shortage of fuel, will be followed by increased activity. This fall, it is freely said, will be one of the busiest ever known in Eastern Pennsylvania. Mills and furnaces now idle or running on reduced time because of the lack of fuel will resume with accumulated orders and in fine shape, as many have been overhauled during the enforced shut down.

In this city most of the works were idle last week for annual repairs, but they resumed with one exception on Monday and will run as long as supplies of fuel and material hold out. There has been no diminution of activity at the Pennsylvania Steel or Central Iron & Steel plants, both of which are running out as fast as possible orders booked last year.

Large quantities of foreign iron and steel are being brought into this section, Scotch pig and English, German and Belgian steel being used. Considerable German steel is being rolled in this city for the building of American ships, this curious state of affairs being due to the scarcity of domestic steel.

The Lalance & Grosjean tin plate mills and the Harrisburg Rolling Mills are making improvements. The latter company are building new puddling furnaces, which will give much larger capacity. The improvement of the Lalance & Grosjean Company will cost $35,000.

The deeds for the Pennsylvania Steel Company's purchase of the Coleman-Grubb interests in the Lebanon district have been filed at Lebanon. They show the following prices: For ore bank interests, $2,025,000; for North Lebanon furnaces, including tracts of properties, $2,000,000; for manufacturing sites and tract, $115,576.88, and for farm tracts, $115,828.12.

Lebanon works are active, with the exception of the plant of the American Iron & Steel Mfg. Company. Two stacks in the Lebanon region are idle. Work on the new buildings for the plant of the Norristown Iron Works, which is to be moved to Lebanon, is going ahead.

The western part of Central Pennsylvania is feeling the strike comparatively little, as it depends on bituminous coal and coke, which are not far away. The resumption of Nittany furnace has brightened up affairs in Centre County, and the starting of Rock Hill has added another active plant to the Huntingdon-Blair-Bedford region. The iron works in these counties are generally busy.

The Geiser Mfg. Company of Waynesboro have shipped an engine to Manila, where it will be used for traction purposes on a plantation. The cost of the transportation to the capital of the Philippines will be $1500, just the cost of the engine to the purchaser. The Emmert Mfg. Company, another Waynesboro concern, are doing well with business for Australia.

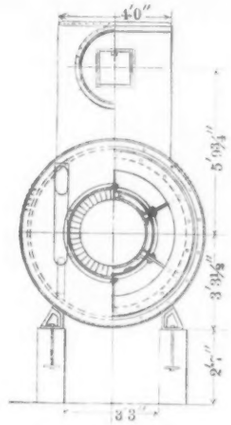


Fig. 6.—Section A B of Fig. 5.

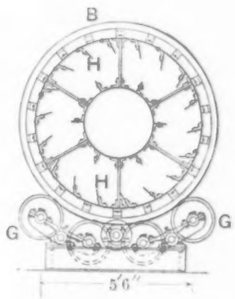


Fig. 7.—Section C D of Fig. 5.

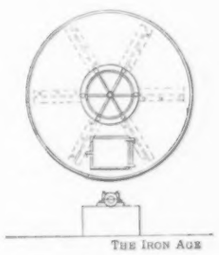


Fig. 8.—Rear Head of Fig. 5.

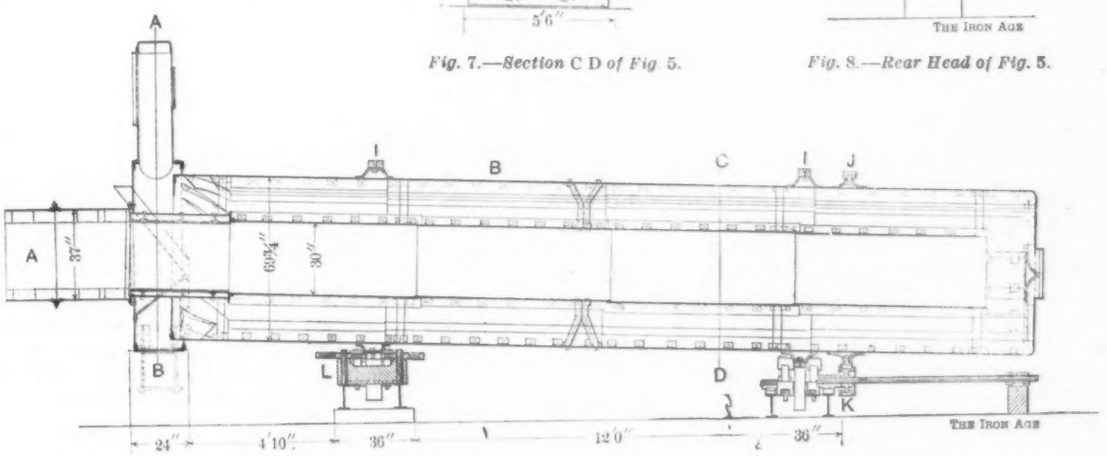


Fig. 5.—Section of Dryer.

THE MANUFACTURE OF CEMENT FROM SLAG.

The heat has interfered considerably with work in some mills, puddlers feeling it intensely in this part of the State. All of the puddle mills in Dauphin, Lancaster and other counties are in operation now.

The Commonwealth of Pennsylvania is arranging to spend almost $500,000 in building and rebuilding of State bridges. By a recent law the Commonwealth must rebuild bridges over navigable streams which have been damaged or carried down in floods. There will be 20 bridges built, and plans are now in course of preparation. The State's Department of Public Buildings and Grounds in this city will have charge of the letting.

The works in Altoona are reported as generally busy and the Altoona Foundry & Machine Works, established this year, are getting along very well. The force of men has been increased.

There are some notable improvements at Catasauqua. The buildings of the Lehigh Foundry Company are being rushed and the Union Foundry & Machine Company are making extensive alterations. The Bryden Horseshoe Company are also contemplating some improvements to their rolling mill.

An interesting event of last week is the feat of Robert

May, a puddler at the Duncannon Iron Works. He turned out 5030 pounds of iron on one turn at a single furnace. The work was done in a contest, the second man making 4330 pounds. s.

British Iron and Steel Statistics for 1901.

The London *Iron and Coal Trades Review* for July 4 publishes extracts from the annual statistical report of the British Iron Trade Association for the year 1901, from which the following statistics of the production of iron ore, coal, iron and steel are taken:

The Output of British Iron Ores.

The total output of British iron ore in 1901 was 12,275,198 gross tons, against 14,028,208 tons in 1900 and 14,461,330 tons in 1899. The total iron ore imports in 1901 amounted to 5,545,845 tons, against 6,297,873 tons in 1900 and 7,054,578 tons in 1899, so that the consumption in iron ores, otherwise than as affected by stocks at mines or works, may be taken at the following figures for the three years:

	Raised.	Imported.	Total.
1899, gross tons.....	14,461,000	7,054,000	21,515,000
1900, gross tons.....	14,028,000	6,298,000	20,324,000
1901, gross tons.....	12,275,000	5,545,000	17,821,000

In addition to the above more than 1,000,000 tons of cinder are annually used in British blast furnaces.

According to the Home Office records of values, the average value of the home ores produced in 1900 was about 6 shillings per ton, against an average of 4 shillings 6 pence per ton in 1895, the year preceding the first rise in prices; so that the average increase of value is estimated at 1 shilling 6 pence per ton.

Including cinder, the average consumption of iron ore per ton of pig produced in Great Britain in 1900 was 2½ tons (exactly 2.46 tons).

Sources of Foreign Ore Supply.

The output of iron ore and ironstone under the Coal Mines and the Metalliferous Mines Acts was less in 1901 than it has been for eight years, but greater than the output of 1892, 1893 and 1894. In 1876 the output of ironstone under these acts was as much as 12,159,580 tons, or nearly 80 per cent. in excess of the output of 1901. There have only been two years in the history of the British iron industry since 1870 when the total British output of iron ore was less than it was last year—those being the years 1892 and 1893.

Of the total imports of iron ore received in the United Kingdom in 1901, 4,749,933 tons were imported from Spain, and 798,955 from other countries. The following table gives the principal imports of iron ore for the last three years:

	1899. Tons.	1900. Tons.	1901. Tons.
Spain	6,186,022	5,551,559	4,749,933
Greece	319,759	304,648	303,825
Algeria	231,361	141,624	189,014
Sweden	105,193	98,055	80,678
Italy	94,771	88,532	70,362
France	38,274	48,165	44,930
Portugal	10,354	11,738	20,020
New South Wales	9,510	4,003	5,878
Asiatic Turkey	8,690	4,111	4,755
Holland	8,009	9,414	13,670
Norway	2,298	6	.....
Belgium	6,649	6,620	5,905
Germany	2,791	3,585	4,017
Newfoundland	2,950	13,234	35,576
Queensland	1,767	1,310	497
European Turkey	3,260	3,950	2,872
Persia	2,144	6,466	757

Output of Coal.

The British output of coal in 1901 compares as follows with that of the previous year:

	1900. Tons.	1901. Tons.
England	159,314,365	153,451,070
Wales	32,618,995	32,686,631
Scotland	33,112,104	32,796,510
Ireland	124,699	103,029
Totals	225,170,163	219,937,240

Output of Coke.

The total output of coke in the counties of Durham and Northumberland during each of the last two years has been as under, according to returns furnished by the Coal Trade Office at Newcastle-on-Tyne:

	1900. Tons.	1901. Tons.
Durham	5,293,015	4,532,645
Northumberland	167,950	128,998
Totals	5,460,965	4,659,643

The numbers of coke ovens employed and unemployed in the same counties were as under:

	1900.		1901.	
	In use.	Out of use.	In use.	Out of use.
Durham	12,675	3,680	12,573	3,882
Northumberland	486	177	449	214
Totals	13,161	3,857	12,962	4,096

No corresponding records are available for the other districts in which coke is produced.

Pig Iron Output.

The total make of pig iron in the United Kingdom during the year 1901 was 7,761,830 tons, which is a decrease of 1,543,489 tons on 1899 and of 1,146,740 tons compared with 1900. In most of the districts there was a falling off in 1901, but especially in Cleveland and on the West Coast. The details for each of the last three years are appended:

	1899. Tons.	1900. Tons.	1901. Tons.
Scotland	1,166,838	1,153,896	1,113,990
Durham	1,040,926	975,627	957,881
Cleveland	2,110,557	2,094,887	1,765,704
West Cumberland	918,210	891,190	744,256
Lancashire	730,262	725,817	641,633
South Wales and Monmouth	942,975	858,450	673,391
Lincolnshire	332,503	350,577	249,939
Northamptonshire	274,600	270,599	225,709
Derbyshire	364,189	335,825	268,058
Notts. and Leicestershire	287,592	317,206	267,661
South Staffordshire	394,445	255,864	338,648
North Staffordshire	304,522	279,183	190,600
South and West Yorkshire	305,476	276,392	246,809
Shropshire	43,664	45,309	40,650
North Wales, &c	88,560	77,748	36,901
Totals	9,305,319	8,908,570	7,761,830

Make of Different Descriptions of Pig.

In the following table we present our usual returns of the output of different descriptions of pig iron in the United Kingdom, the figures showing in every case a notable decrease on those for the previous year:

	Forge and foundry. Tons.	Hematite. Tons.	Basic. Tons.	Spiegel, ferro and others. Tons.	Total all descriptions. Tons.
Scotland	548,990	520,000	45,000	.....	1,113,990
Durham	424,998	436,985	81,570	14,328	957,881
Cleveland	904,120	503,373	325,782	32,429	1,765,704
Cumberland	91,327	613,714	.....	39,215	744,256
Lancashire	29,134	517,308	27,163	68,028	641,633
South Wales and Monmouth	68,637	586,304	.....	18,450	673,391
Lincolnshire	181,484	.....	68,455	.....	249,939
Northamptonshire	225,709	.....	.....	.....	225,709
Notts. and Leicester	267,661	.....	.....	.....	267,661
Derbyshire	268,058	.....	.....	.....	268,058
South Staffordshire	227,401	.....	111,247	.....	338,648
North Staffordshire	190,600	.....	.....	.....	190,600
South and West Yorkshire	144 106	.....	102,703	.....	246,809
Shropshire	23,028	.....	17,622	.....	40,650
North Wales	2,741	.....	15,245	18,915	36,901
Totals	3,597,994	3,177,684	794,787	191,365	7,761 830

The following is a statement of the make of different descriptions of pig iron in 1900 and 1901:

	1900. Tons.	1901. Tons.
Forge and foundry	4,108,350	3,597,994
Hematite	3,636,839	3,177,684
Basic	924,987	794,787
Spiegel, &c	238,394	191,365
Totals	8,908,570	7,761,830

Stocks of Pig Iron.

In the statistical report for 1900 it was pointed out that the stocks of pig iron in the United Kingdom at the end of 1900 were almost the lowest on record for half a century. The total, including the stocks in makers' hands so far as these could be ascertained, then amounted to 456,419 tons, compared with a total of 733,989 tons at the end of 1899 and a total of 945,307 tons at the end of 1898. The corresponding stocks at the end of 1901 amounted to 464,033 tons.

The total stocks of pig iron in the United Kingdom at the close of the past six years were as follows:

Year.	Public stores. Tons.	Makers' stocks, excluding Cleveland. Tons.	Total. Tons.
1896	1,047,853	254,528	1,312,931
1897	663,611	333,884	997,495
1898	680,927	264,380	945,307
1899	559,793	174,196	733,989
1900	156,193	300,226	456,419
1901	210,160	253,873	464,033

In the Cleveland district makers have not published returns of the stocks of pig iron in their own hands since the year 1895, and they cannot be accurately stated now.

Statistics of Blast Furnaces.

The average number of furnaces in blast in the United Kingdom for the year 1901 is returned at 351, against 397 for the previous year. The total number of furnaces out of blast over the year was 206, against 165. The number of furnaces in existence at the end of 1901 was 557, against 562 at the end of 1900, being a decrease of five. The details follow:

District.	In blast.	Out of blast.	Total.
Scotland	84	15	99
Durham	30	9	39
Cleveland	49	31	80
West Cumberland	24	21	45
Lancashire	21	15	36
South Wales	22	33	55
Lincolnshire	13	8	21
Northamptonshire	11	10	21
Derbyshire	25	12	37
Notts. and Leicester	15	5	20
South Staffordshire	19	16	35
North Staffordshire	14	14	28
South and West Yorkshire	16	11	27
Shropshire, North Wales, &c.	8	6	14
Totals	351	206	557
Totals in 1900	397	165	562

Production of Manufactured Iron.

The total output of puddled bar in the United Kingdom in 1901 was 974,476 tons, against 1,162,765 tons in the previous year. The decreased output in 1901 was 188,289 tons, or 16.2 per cent. This is the largest decrease that has taken place for a considerable period, although—excepting only one year, when there was a slight advance—the make of puddled iron in Great Britain has been declining for a number of years past. The decline may even be greater than is indicated by the above figures, inasmuch as some works which continue to make puddled iron roll both iron and steel in the same mills, and do not find it easy to keep complete records of the quantities of each over the whole 12 months.

The following figures, which can only be accepted as approximately correct, so far as they go, and which, of course, do not cover the whole range of manufactured iron products, show the output of leading descriptions of finished iron in 1902, and make it clear that bar iron is the chief product of the trade, followed by sheets, boiler plates, hoops and wire rods, which latter product is mainly limited to Lancashire:

	Bars.	Boiler plates.	Sheets.	Strips.	Angles.	Rounds and Squares.	Hoops.	Wire rods.
Scotland	121,437	.....	28,833	9,057	.....	1,372	1,112	.....
Cleveland	36,370	73,627	17,253	25,500	.....	13,256	22,500	.....
South Staffordshire	45,200	.....	42,500	.....	9,894	32,300	.....	.....
North Staffordshire	47,413	7,096	.....	.....	.....	6,760	5,640	.....
Derbyshire	14,596	3,950	.....	.....	1,348	.....	.....	.....
Lancashire	56,346	2,265	30,052	1,008	.....	16,471	36,404	57,287
S. and W. Yorkshire	72,442	1,712	.....	1,820	.....	.....	4,582	.....
Cumberland	11,292	.....	.....	.....	.....	.....	.....	.....
Shropshire and Wales	.....	.....	.....	.....	.....	.....	11,173	.....
Totals	405,066	88,650	118,638	37,385	11,242	70,159	81,411	57,287

The Open Hearth Steel Industry.

The total output of open hearth steel ingots in the United Kingdom in 1901 was 3,297,791 tons, compared with 3,156,050 tons in 1900 and with 3,030,251 tons in 1899. The increase of output in 1901 over 1900 was 141,741 tons, which is not equal to the advance made in some previous years, but is, nevertheless, above the average of the last ten years. The greatest advance in 1901 has been attained in South Wales. The details follow:

District.	1899. Tons.	1900. Tons.	1901. Tons.
Northeast Coast	1,039,764	1,003,251	929,941
Scotland	940,235	963,345	949,697
South and North Wales	459,770	550,568	738,854
Sheffield and Leeds	230,115	257,234	309,999
Lancashire and Cumberland	167,060	156,848	158,150
Staffordshire, Cheshire, &c.	193,307	224,804	211,150
Totals	3,030,251	3,156,050	3,297,791

The make of basic steel ingots by the open hearth process does not make nearly the same progress in the United Kingdom that it does abroad. The total output of basic open hearth steel in 1901 was 351,177 tons, whereas the total output of acid open hearth steel for the same year was 2,946,614 tons. The preponderance is on the other side in both Germany and the United States. The next table gives details of the two descriptions for 1901:

District.	Acid. Tons.	Basic. Tons.	Total. Tons.
Scotland	948,659	1,038	949,697
Northeast Coast	855,517	74,424	929,941
North and South Wales and Mon.	704,911	33,943	738,854
Sheffield and Leeds	266,896	43,103	309,999
Lancashire and Cheshire	122,610	35,540	158,150
Staffordshire, Scotland, &c.	48,021	163,129	211,150
Totals	2,946,614	351,177	3,297,791
Totals in 1900	2,862,566	293,484	3,156,050

So far as has been ascertained the principal finished products produced by the open hearth process in 1901 were as under:

	1899. Tons.	1900. Tons.	1901. Tons.
Plates and angles	1,265,747	1,183,238	1,210,500
Bars, &c.	675,519	622,414	605,101
Blooms and billets	398,581	490,902	510,000

At the end of 1901 there were 482 open hearth furnaces in the United Kingdom, while 20 others were being built, bringing up the total to 502.

The Bessemer Steel Industry.

Returns made by the manufacturers to the British Iron Trade Association show that the total output of Bessemer steel ingots in the United Kingdom in the year 1901 was 1,606,253 tons, against 1,745,004 tons in 1900 and 1,825,074 tons in 1899. The details for the different districts are as follows for each of the last two years:

District.	1899. Tons.	1900. Tons.	1901. Tons.
South Wales	528,135	439,791	384,212
Cleveland	351,127	332,499	326,109
Sheffield and Leeds	329,886	328,934	278,272
West Cumberland	253,490	327,450	327,397
Lancashire and Cheshire	214,119	174,680	156,338
Scotland, Staffordshire, &c.	148,317	141,650	133,925
Totals	1,825,074	1,745,004	1,606,253

The production of Bessemer steel rails in the United Kingdom in 1901 appears to have been much under the average of previous years, and is the smallest with only two exceptions for the last 20 years. Details follow:

District	1899. Tons.	1900. Tons.	1901. Tons.
South Wales	152,174	147,725	165,173
Cleveland	148,333	146,633	169,198
Sheffield and Leeds	158,824	145,303	108,726
Cumberland and Lancashire	355,286	318,369	278,963
Staffordshire, &c.	23,531	1,814	10,200
Totals	838,148	759,844	732,260

The statistics collected by the association show that the total quantity of basic steel produced in 1901 by the basic Bessemer process was 490,268 tons, against 517,378 tons in 1899, and 491,101 tons in 1900. Six works are producing basic steel by the Bessemer system, and more than one-half of the whole is still produced in the Cleveland district.

The quantities of the chief descriptions of finished Bessemer steel, of which particulars have been ascertained by the association, were as under:

	1899. Tons.	1900. Tons.	1901. Tons.
Rails	838,148	759,814	732,280
Plates and angles	158,878	96,108	75,479
Sleepers	35,743	27,291	no record
Blooms and billets	355,335	280,220	175,800
Bars	214,951	221,795	251,075
Totals	1,603,055	1,385,228	1,234,634

Make of Open Hearth and Bessemer Steel Compared.

In the following table are presented details of the British make of open hearth and Bessemer steel ingots for each of the last six years:

Year.	Tons.	Tons.	Tons.
1896	2,317,555	1,815,842	4,133,397
1897	2,601,806	1,884,155	4,485,961
1898	2,806,600	1,759,386	4,565,986
1899	3,030,251	1,825,074	4,855,325
1900	3,156,050	1,745,004	4,901,454
1901	3,297,791	1,606,253	4,904,044

A Proposed Bar Mill Consolidation Abandoned.

(*By Telegraph.*)

CHICAGO, ILL., July 15, 1902.—The active competition which has resulted in the sale of bar iron under 1.75 cents has been the motive for a determined effort to consolidate most of the independent bar iron mills in the Central West. A company was projected recently with a proposed capital of $6,000,000 to embrace the following mills:

The American Rolling Mill Corporation, Muskegon, Mich., and Muncie, Ind.

The Emlyn Iron Works, East Chicago, Ind.

National Rolling Mill Company, Hartford City, Ind.

Highland Iron & Steel Company, Terre Haute, Ind.

Eagle Horse Shoe Company, South Milwaukee, Wis.

Zanesville Iron Company, Zanesville, Ohio.

The Ohio Falls Iron Company, New Albany, Ind., and Hirsch Rolling Mill Company, St. Louis, Mo.

It is claimed that with the best mill practice the present prices of scrap and pig iron will allow no profit, and in fact that there is an actual loss in selling bar iron at 1.75 cents and under. It was hoped that by consolidating the above mills better control of the market could be exercised and sales of the finished iron be made only on a profitable basis. The refusal of some of the mills, notably the Emlyn Iron Works, to enter the combine caused the abandonment of the plan during the week, and it is thought that no further effort will be made to bring about a consolidation. Possibly some agreement as to selling prices may result from the agitation.

At the Wheeling convention of the Amalgamated Association of Iron, Steel and Tin Workers it was decided that the vice-presidents of the various districts should meet at Columbus, Ohio, at as early a date as practicable, to compare special scales and district rulings, with a view to making them as nearly uniform as possible. Thursday, July 17, has been agreed on between President Shaffer of the Amalgamated Association and James H. Nutt of the Republic Iron & Steel Company, and if agreeable to all the vice-presidents the conference will be held on that day. In addition to the work assigned it by the convention the meeting will also arrange the scale for plate mills. The meeting will be a unique one in the history of the Amalgamated Association, nothing of the kind ever having been done before, but it has been made necessary on account of the differences in various scales for special mills, which the workers believe should be more uniform.

The Inland Steel Company.—The Inland Steel Company announce that the open hearth steel works at Indiana Harbor, Ind., which have been under construction for nearly a year, will be in operation the last of this week with a daily output of 500 tons.

The Southern Coal Miners' Scale.

On the 11th inst., at Birmingham, Ala., representatives of the Southern coal operators and of the United Mine Workers of America came to an agreement on a scale of wages for the coming year. Work in Southern coal mines had been suspended for two weeks, pending the adoption of the scale, and a number of blast furneces had been banked for lack of coke, causing considerable inconvenience to consumers of pig iron. The resumption of work by the miners will enable these furnaces to resume operations speedily. The new agreement is as follows:

We, the Joint Scale Committee of your honorable body, with full authority from the association of operators and convention of miners, beg to report the following contract, to remain in force until June 30, 1903, with the old scale prices, rules and regulations now in force, with the following additions:

1. With a view of remedying conditions that have developed in carrying out the joint resolutions adopted last year providing for arbitration of differences, it is hereby agreed that the U. M. W. of A. will not ask the companies to take up any grievance for adjustment during suspension of work, unless authorized by district officers.

2. Funeral clause left for local adjustment.

3. Absentee clause left for local department.

4. That the day wage scale heretofore in effect is hereby canceled and the following uniform day wage scale adopted, based on 55 cents per ton for mining coal, to go up and down with the scale as before:

Drivers	$1.78
Drivers, minimum	1.47½
Spike team drivers, 25 per cent. extra, and for each mule over two 10 cents extra.	
Trackman	2.69
Trackmen helpers	1.70
Trappers	.93½
Brattice men	2.69
Inside engineers	1.95
Outside engineers	2.56
Tail rope chainers	1.78
Slope chainers	1.78
Steam pumpers	1.78
Furnace firemen	1.50
Boiler firemen	1.85
Slope repairmen	2.40
Dumpers	1.52
Scalers	1.52
Tipple middlemen	1.48
Coupler	1.69
Greaser	1.04
Pin puller	1.64
Railroad car loader	1.62½
Ash roller	1.35
Car repairer	2.47½
Machinist	2.49
Blacksmith	2.96
Blacksmith helper	1.67
Drummers	2.02
Miners on company work	2.93
Stableman	1.37½

All men working on rock shall not receive less than miner on company work, and all other common day laborers for inside work not mentioned on the scale to be paid $1.78 per day.

5. That two or more cars daily shall be set aside to determine average weight of cars at mine that are now paying by the tram or car. Time of weighing to be at the option of operator.

6. That 5 per cent. shall be the maximum grade over which a miner shall be required to push cars.

7. To avoid probability of misunderstanding, it is hereby recorded that the contracts specify all coal in Pratt seam under 3 feet 2 inches shall pay 2½ cents per ton above scale shown; when size of coal in Pratt seam goes below 3 feet then the price is 5 cents per ton above scale shown.

The Diamond Drill & Machine Company of Birdsboro, Pa., are beginning to make their iron castings this week, practically losing but three weeks by the recent complete destruction of their foundry by fire.

The Iron Age

New York, Thursday, July 17, 1902.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
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JOHN S. KING, - - - - - - - - - - BUSINESS MANAGER.

The Iron Age Index.

The Index to the reading matter of Volume LXIX of *The Iron Age*, for January 1 to July 1, 1902, is now on the press, and will be mailed to those subscribers of *The Iron Age* who will make application for it.

In order to relieve those who bind or file *The Iron Age* of the trouble of future applications for the semiannual Index, we have a special list to whom the Index is forwarded without further notice. Subscribers who desire to be entered upon that list will kindly so advise us.

Interesting Phases in the Iron Industry.

It is interesting to note the evolutionary process in the iron and steel industry as reflected in the markets for raw and finished material from week to week. The unprecedented demand for all sorts of iron and steel, in conjunction with the policy adopted by the large consolidated interests—to allow only a narrow margin between the prices of raw and intermediate products on the one hand and finished manufactures on the other—has made a readjustment among independent concerns necessary. During the past six months dependent consumers of steel billets and sheet bars have met with more or less difficulty in obtaining adequate amounts of steel billets and bars, notwithstanding the increased production of open hearth billets noted in January, and in not a few instances mills have been compelled to suspend operations from time to time. These conditions have opened markets throughout this country to foreign steel, and not a few of the most important mills have been able to continue in active operation by consuming foreign material. Yet more or less difficulty has been encountered and the result has been the further building of many new domestic open hearth furnaces, it being estimated by those thoroughly conversant with the situation that by January next the production of open hearth steel will have been increased from 50 to 60 per cent. over the output of the previous year.

At the moment the closing of many mills for the usual summer repairs is reducing the consumption and causing the resale of both domestic and foreign billets, while European dealers and producers of billets are offering their products here more freely than ever—for July, August and September shipment—through personal canvass. The result can scarcely but be reduced prices, at least temporarily. But the present difficulty in obtaining adequate supplies of pig iron, notwithstanding the continued large output of the blast furnaces and the relatively light supply of scrap available, is introducing new elements calculated to retard the rapid expansion of the production of open hearth steel.

It is estimated by manufacturers of steel rails that the requirements of the railroads for rails for the year ending June 30, 1903, will be at least 2,000,000 tons, 1,000,000 tons of which already have been placed with the four rail producing interests. Of this amount about 1,250,000 tons, it is thought, will be required for renewals, the balance for extensions. Of the 1,250,000 tons probably one-fifth will be utilized for relaying. This means that only about 1,000,000 tons of scrap will be available for remelting from this source next year, and, aside from the railroad material, there will be a relatively small quantity of scrap available for the open market.

Should the enormous consumption of pig iron of the current year be continued—and it is estimated by the largest interests that the demand will continue for another year at least—manufacturers of the finished material outside of the large interests which control their own ore and coal mines and coke ovens will find themselves in an unprotected position.

Because of these facts not a few interests outside of the consolidation are purchasing iron mines and making determined efforts to provide ample fuel, recognizing that they must be independent of the large companies, whose policy it is to consume their own products of raw and intermediate material.

It is also learned that steps have been taken by large independent interests to build converters and manufacture structural shapes.

With the present slow deliveries of pig iron, the scarcity and high prices of pig iron for immediate and nearby delivery, the high prices of scrap and a stringent market, it is somewhat of an anomalous condition to find the bar iron market so weak. It must be that much of the bar iron now coming on the market has been produced from lower priced pig and scrap. It is a well-known fact that the bar iron being sold on a lower basis than 1.75 cents cannot now be replaced except at a loss, the ratio existing between the present market prices of iron bars and scrap showing a narrower margin than ever before. Still the active competition between manufacturers of bar iron and manufacturers of soft steel bars is so keen that the largest bar iron producers seem willing to meet the issue, being evidently of the opinion that it is better to hold the trade against steel, even at a sacrifice of profit, than to advance prices and run the risk of losing business, they recognizing that the maintenance of prices of steel bars at a lower level than iron bars by the largest interests is an effort to force the consumption of steel at the expense of bar iron. It is notable, however, that a respectable minority of bar iron mills take exceptions to this policy, having confidence in their ability to meet the competition of steel even at a moderate advance in prices. It is an interesting trade war, in which the chemist and the scientific mill practitioner have important parts assigned.

Those who pride themselves on being conservative profess to have very serious doubts on the all absorbing question whether the present enormous rate of consumption of iron and steel can be maintained. Of course their fears will be ultimately justified by a falling off in the requirements of the country. It has always been our experience that periods of expansion are followed by years of resting. But that there is an enormous amount of work before the industry is obvious in many directions. A few weeks since the Master Car Builders' Association dismissed the question of the maintenance of steel cars. It was shown in order to illustrate the development of this new source of consumption of iron that the Schoen Company and their successors, the Pressed Steel Car Company, made in 1897 501 cars, in 1898 2931 cars, in 1899 9624 cars, in 1900 16,671, and in 1901 24,590 cars. Up to June 1, 1902, not less than 63,872 cars had been built, and it was estimated that the operations of other car building concerns would carry the total up to 70,000 cars. Impressive as that total is,

the startling fact, to us, is that that number represents less than one-half of 1 per cent. of the total number of cars in service in the United States. Surely there is a great deal of room for expansion in this field, and millions of tons of steel plates, shapes and bars will have to be rolled before we get down to a simple renewal basis.

The Johnstown Mine Calamity.

The loss of life in the coal mine explosion at Johnstown, Pa., which occurred on the 10th inst., proves to have been considerably less than was at first estimated. This is something of a relief, as the earliest reports sent out were of a character to make the disaster dreadfully reminiscent of the appalling loss of life by the flood of May 31, 1889, when that town was almost destroyed. Nevertheless, this fresh calamity will take rank among the most serious mine disasters, as according to latest advices the number of the dead is known to have been 112, and other victims may be discovered when the workings are completely explored. The cause of the catastrophe is stated to have been an explosion of fire damp in one of the Cambria Steel Company's coal mines, known as the Rolling Mill mine, in which a force of over 700 men were employed, producing about 2500 tons of coal daily. This mine was first opened in 1861 and has since been the best of the company's mines, furnishing much the greater part of their coal supply.

As usual when a disaster of this kind occurs, harsh criticism was immediately leveled at the Cambria Steel Company for not having taken proper precautions for the safety of the miners. It appears, however, that the strictures were not even remotely deserved, as the State mine inspectors have freely discussed the condition of the mine with press representatives, stating that they had always found it among the best over which they had supervision. Intimations are given that at the inquest, which is shortly to be held, the responsibility for the accident will be clearly shown to rest upon one of the miners, who probably violated the regulations adopted for the safety of himself and his fellows and perished as a result of his own carelessness. This contingency is always necessary to be borne in mind in passing judgment relative to a mining accident, especially an explosion of fire damp. The appliances for ventilation may be of the most elaborate character, and every conceivable care may be taken by the owners and engineers of a mine, only to be set at naught by some reckless or thoughtless miner, disposed to take chances of an accident, either to increase his output and his earnings or to avoid inconvenience to himself. It is most deplorable that such a miner cannot perish alone if he willfully violates regulations adopted for his own safety. But he never does. In this case not only were scores of his fellow miners swept out of existence, but heroic superintendents and foremen also lost their lives in endeavoring to rescue those who might be imprisoned in other workings. It will be many long years until the recollection of this great calamity is effaced from the memories of either those who were rescued or those who belong to the bereaved families.

The publication by the British Iron Trade Association of full details of the past year's production of iron and steel in Great Britain, so closely following the appearance of the annual report of the American Iron and Steel Association, calls fresh attention to the relative position of Great Britain and the United States in the iron and steel industry. The tone of the two reports presents a sharp contrast. The British report shows declining production in every branch of the industry, with the single exception of open hearth steel. As compared with the previous year, 1901 witnessed a falling off of over 12 per cent. in pig iron, 16 per cent. in puddled iron and 8 per cent. in Bessemer steel ingots, while the increase in open hearth steel ingots was only 4 per cent. On the other hand, the American report showed a gain in 1901 of almost 15 per cent. in the production of pig iron, 30 per cent. in Bessemer steel ingots and over 37 per cent. in open hearth steel ingots. It is but a few years since Great Britain led the world in the production of all kinds of iron and steel, but in 1901 the United States made more than double the quantity of pig iron turned out by British furnaces, over five times as much Bessemer steel and nearly 50 per cent. more open hearth steel. This country is now so far in the lead that the gap seems destined to continue to widen.

CORRESPONDENCE.

Reaction Against Municipal Ownership.

To the Editor: The writer hopes he may be pardoned for taking exception to what is implied in your editorial, in issue of June 26, entitled "Reaction Against Municipal Ownership." It seems to me that the title of this article is a misnomer. You assume to argue against municipal ownership, but as a matter of fact the case which you cite bears upon municipal operation.

I do not think it can be clearly shown that there is a reaction against municipal ownership. On the contrary, it seems to me, and I have been somewhat of an observer of these matters, that the tide is setting more strongly in that direction. What did the vote recently taken in Chicago on this question mean? I believe that it was more than five to one for municipal ownership, not only of the electric light and gas systems, but also of the street railways. This expression of public opinion was very significant. There can be no question that the most prolific source of corruption in municipal politics has been through the relations of city officials with the public service corporations. Franchises have been given away, or sold for a nominal sum, which within a few years have proved to be of tremendous value, and the people have awakened to the fact that they have been deprived, through the action of incompetent or dishonest public servants, of property rights which will be difficult of recovery.

Please bear in mind that I am not arguing for municipal operation of public utilities. My belief is that the ideal method of treatment of these matters would be for cities to retain the ownership of the franchises and lease them for limited periods to corporations, under contracts which would secure efficient service at reasonable rates, and, while protecting the interests of the municipality and its taxpayers, afford a fair return on the investment to the lessees. Permit me to direct your attention to an article in the last number of the magazine, *Municipal Affairs*, published by the Reform Club, upon the operation of the street railways in the city of Milan, Italy. The method pursued there by the authorities in making a contract for the lease of the street railway privileges, it seems to me, conserves the interests of all concerned. I have seen no better plan for the treatment of the matter than the one which has been adopted in Milan. I would beg further to call your attention to report of James Boyle, United States Consul at Liverpool, recently published, and dealing with municipal ownership in Great Britain.

Permit me to repeat that I do not think it can be proved that there is any less desire throughout the civilized world for municipal ownership. The question of handling franchises and privileges, however, when they are acquired by cities, is one which should properly engage the best thought of all students of these matters and of all public spirited citizens.

Very respectfully.

EDMUND H. TITCHENER.

BINGHAMTON, N. Y., July 12, 1902.

[The position assumed by our correspondent is in the

main well taken. Nevertheless, the developments to which reference was made in our editorial show that the sentiment abroad with regard to municipal ownership, municipal operation, municipal trading, or what not, is no longer running wholly in one direction, but that aggressive opposition has sprung up, based on unsatisfactory results. It has been proved that the mere fact of municipal control will not insure the abolition of all evils in the operation of public utilities. As to the vote in Chicago taken last April, its significance shrinks when the fact is known that many citizens did not trouble themselves to record their position at the polls because they knew that the proposition was impracticable, the city having no funds to carry out such a scheme and being unable to increase its bonded indebtedness except through new legislation, which might not be granted.—THE EDITOR.]

The Iron Making and Shipbuilding Industries of Germany.—I.

The meeting of the naval engineers of Germany at Duesseldorf was the occasion of the presentation of a very valuable memoir by E. Schroedter, the secretary of the German Society of Iron Manufacturers, which has also been printed in English. Besides much historical material of value, the memoir furnishes some data relative to those branches of iron and steel manufacture which are so closely dependent upon the prosperity of shipbuilding. Conspicuous among these is

The Manufacture of Plates in Germany.

In regard to ship plates, the earlier iron vessels were built of a material, which, according to present ideas, must be looked on as of very poor quality, and which was made, under favorable conditions of manufacture, almost exclusively in England. It was very cheap, and, except in so far as its brittleness made itself unpleasantly felt, was sufficient for its work, if only made thick enough.

For the German works to compete successfully with material of this quality was impossible, and, in addition, they were far behind the English works in facilities for producing large quantities. However, in the years 1880 to 1886 they made their better grades in such quantities that they had to go beyond Germany to seek for customers. When, then, the steel manufacture began to drive out the iron, a few of the works, in the years 1884 to 1899, even sent their steel plates to England.

To the French belongs the credit of having, in the beginning of the seventies, first introduced steel (it was, at first, a hard material that was required) to a considerable extent into shipbuilding, after Martin had, with the help of the Siemens gas furnace, succeeded in producing mild steel in the open hearth. The annals of the Institution of Naval Architects and of the Iron and Steel Institute are witness to the fierce contests which had to be waged before the mild steel made its way. In England and Germany this material first came into more general use for shipbuilding in the beginning of the eighties, after the English Lloyd's, had, in the year 1878, accepted mild steel as a material for the building of ships and boilers, with reductions of thickness amounting in the case of the hulls of the vessels to 20 per cent., and in that of the boiler plates to 25 per cent.

The material thus produced in the acid open hearth was, in the beginning of the eighties, generally procured by the German yards, principally for the building of warships, from steel works near Glasgow and from works in Styria. Shortly afterward the manufacture of this material was successfully taken up by Krupp.

After the basic process, in the converter and in the open hearth, had been introduced into Germany a revolution took place, and mild steel rapidly took possession of the market, and already, in the years 1894 to 1898, it had almost quite driven out the wrought iron ship plates, which to-day have practically disappeared. According to my information, the Hörder Verein made a new departure in about the middle of the eighties, when it entered with great energy on the production of material for shipbuilding, and was in a short time in a position to supply not only all required ship plates, but also all the necessary angles or other sections. As a matter of fact, this company delivered all the material for a considerable number of large vessels, without the assistance of other works.

The capacity of the German plate making industry was greatly increased after the year 1880 by reconstructions of the older rolling mills and by the laying down of new ones. According to statistics specially compiled for this purpose, for which 25 plate mills supplied data, their producing capacity rose from about 105,000 tons in the year 1880 to about 818,000 tons in the year 1901. These figures illustrate in the clearest manner the rapid development of the works in question. This increase has taken place chiefly during the last 12 years, for while the producing capacity of the German works in the years 1880 to 1890 little more than doubled, in the period from 1890 until to-day it has increased fourfold—*i. e.*, from 236,000 tons in the year 1890 to 818,000 tons in the year 1901. To-day the producing capacity of the German works is nine times as great as it was 22 years ago.

Hand in hand with the increase in quantity and improvement in quality went, and especially in recent years, an increase in dimensions. The works have met the wishes of the boiler makers and shipbuilders in the most ready manner, and one after another have laid down rolling plant, which enable them in case of necessity to produce material in dimensions which would a while ago have been looked on as impossible.

From the above mentioned statistical compilation it may, in this connection, be further pointed out that in the year 1880—*i. e.*, 22 years ago—only one single firm could deliver plates 9 feet 2¼ inches wide, while two other firms could deliver to 6 feet 2¾ inches and 7 feet 6½ inches wide, respectively. Not long afterward, however, in 1885, plates of 10 feet 9½ inches could be offered in the market. After considerable extensions, which were undertaken here and there in the nineties, circles can now be delivered in diameters up to 12 feet 11½ inches in place of 9 feet 2¼ inches, which could be produced in the year 1880.

The German works can now supply ship plates up to 65 feet in length, and marine boiler plates up to 59 feet in length, by 11 feet 9½ inches in width, and by 1.57 inches in thickness in each case. At the request of a customer, the works will undertake to supply plates in still greater dimensions than the foregoing. The tremendous development in producing capacity will be evident when it is stated that some of the German makers of ship and boiler plates can roll out an ingot that weighs 29½ tons.

At the same time, according to the statements of the above 25 plate rolling firms, there were produced, in the shape of plates of all kinds, in Germany 22 years ago, that is,

	Tons.
In the year 1880, about	74,800
" " 1887, about	147,600
" " 1893, three times as much	216,500
" " 1895, four " " "	295,300
" " 1897, five " " "	374,000

and to-day—*i. e.*, in 1901—more than seven times as much, equal to about 541,000 tons. Of the total production of all the 25 firms in the period of 22 years, which amounted to about 5,300,000 tons, about 1,210,500 tons consisted of ship and marine boiler plate material—that is, about 23 per cent. of the total.

The ship plate production increased from the year 1880 onward until the year 1897, constantly though slowly in volume, from 17,000 tons in the year 1880 to 59,000 tons in the year 1897. The years 1898 to 1901, however, show a very considerable increase, the output of ship plates amounting

	Tons.
In the year 1898 to about	118,000
" " 1899 "	137,800
" " 1900 "	167,700
" " 1901 "	207,000

This represents a twelvefold increase from the year 1880 to the year 1901.

Compared with the total output of plates of all kinds, the proportion of deliveries of ship plates varies be-

tween 14 per cent. in the year 1893 and 40 per cent. in the year 1901. It may be of interest to note, further, that the above named 1,210,500 tons divide into ordinary ship plates, about 1,125,900 tons, or 93 per cent., and marine boiler plates, about 84,600 tons, or 7 per cent.

If the ship and marine boiler plates be divided under the heads of wrought iron plates and mild steel plates, the ordinary ship plates come to about 12 per cent. for iron and 88 per cent. for mild steel, and the boiler plates to about 22 per cent. for iron and 78 per cent. for mild steel.

If the proportions be taken on the total output of plates of all descriptions, the deliveries of the German plate rolling firms in the 22 years amount to about 2.4 per cent. of iron plates, about 19 per cent. of mild steel plates, about 0.3 per cent. of iron boiler plates and about 1.3 per cent. of mild steel boiler plates, or together 23 per cent., as above given.

The figures just given are taken, as has been observed, from the statements of the 25 plate mills, and they represent deliveries of all kinds, including those for the imperial navy and those for the river vessel building yards. The figures are, in my opinion, in some cases too large, because land boiler and other iron work of this kind is often carried on in conjunction with shipbuilding in the same yard, and the material for these varous works is apt to be all classed under the same heading. This surmise is confirmed by the inquiry, instituted by the Verein deutscher Schiffswerften (German Shipbuilders' Association), concerning the question of material used in shipbuilding in the years 1899 and 1901, according to which the following amounts were delivered to 22 yards:

	From home sources.		From foreign sources.		Total.
	Tons.	Per cent.	Tons.	Per cent.	Tons.
1899.....	69,160	73.2	25,268	26.8	94,428
1901.....	97,600	88.7	11,124	11.3	108,724

These figures confirm the general view of the development obtained from the statements of the rolling mill firms, and the evidence which they give of the increase in the connection between the rolling mills and the shipyards is highly satisfactory.

A general glance at the foregoing shows that, thanks to the tireless exertions of German plate makers, the iron making industry of the country in regard to output, as in regard to producing power, has wonderfully increased.

Shenango Valley Notes.

The wire nail mill of the Sharon Steel Company will soon be started on double turn. It has been running single turn and has been making about 1500 kegs per day.

Repairs are about completed at the New Castle tin mills and they will shortly resume operations.

The Mahoning Valley Electric Railway has inaugurated its freight service between Youngstown and New Castle, and is having a most successful season both as to its freight and passenger service.

The several new mills of the Sharon Steel Company are rapidly approaching completion. The tube mill will be ready for operation this fall.

At the bimonthly settlement of the sheet and tin plate scales at Pittsburgh last week it was found that the average prices of shipments of sheets and tin plate in May and June did not warrant any advance in wages to the men in July and August. At the bimonthly settlement of the bar iron scale in Youngstown, Ohio, last week it was found that the average prices of shipments of iron bars in May and June warranted an advance of 25 cents to puddlers and 2 cents to finishers for July and August. Puddlers are now being paid $6 a ton, the highest wage for many years.

"Pittsburgh Securities" is the title of a little book issued by Robert C. Hall of Pittsburgh. It deals with the different corporations in which Western Pennsylvania is interested, giving information on the stock issued, bonded indebtedness, earnings and organization.

Gas Engines.*

BY C. H. NUTTING.

I have been asked to read a paper on gas engines at this meeting, and while no doubt there are many here who could write a better paper, I am willing to do what I can and hope that I can make you see the great advantage to gas companies by getting all the gas engines possible connected to your mains.

The engine is practically a modern machine, dating from about 1870, when it was improved so as to make a commercial success. The gas engine of the present day can be used for any purpose where power is wanted, and can be depended on with as much reliability as any steam engine. The day is gone when the gas engine was thought of only as an experiment or as a plaything, but it has come to stay. It is also a very economical power, and its adaptability to all uses is becoming better known every day. For the lighting of large stores and office buildings by electricity and generating the current by power derived from a gas engine it is becoming quite popular and is a great success. A good gas engine direct connected to a dynamo, or directly belted to a dynamo, will not vary in voltage over 1 per cent. This I have demonstrated myself in several instances. Of course, there are a great many gas engines made that will not keep the voltage within this limit. I am now referring to the hit and miss governor and not to the throttling type of governor, where it takes a charge of gas at every revolution. It is now a well recognized fact that about one-half the volume of gas consumed in direct lighting will produce the same amount of candle power when used in a gas engine for generating electricity for lighting.

When the mere fact of the cost of gas for direct lighting and its cost for producing the same light by its use in a gas engine to run an electric generator is considered, the difference in favor of electric lighting in preference to direct gas lighting is most apparent.

Comparative Economy of Gas Engines and Electic Motors.

In *Engineering News*, under date of February 27, 1902, is a very interesting article, showing the comparative economy of gas and electric motors for small powers, which I will here give:

"The gas engine and the electric motor have for many years been in competition with each other for small power installations in towns and cities where gas and electric current are generally available. Wherever the power is required intermittently, and frequent stopping and starting is necessary, or where the size of the motor required is very small, the electric motor is, of course, by far the better; but where a motor is run steadily all day the lower cost of operating the gas engine in many cases more than offsets the other advantages of the electric motor.

"An excellent opportunity to compare the economy of the two systems is furnished by the experience of the printing office in which the composition on *Engineering News* is done, and we are able to present the following comparative figures through the courtesy of its owner and manager, Charles J. O'Brien. Power is used chiefly to run linotype machines and small job presses. At present two motors are in use, a 15-horse-power gas engine and a 25-horse-power Crocker-Wheeler electric motor; the latter was installed some time in 1901. The average load carried is only about 10 horse-power, but occasionally a much heavier load is thrown on, necessitating a large capacity motor. City illuminating gas is used, costing $1.05 per thousand cubic feet. Electric current is taken from the Edison mains and the price is 10 cents per affective horse-power hour, subject to a discount of 50 per cent. and 5 per cent., making the net price 4.75 cents per horse-power hour.

"A comparison has been made between the two months October 9 to December 11, 1900, when the gas engine alone was used, and the two months October 4 to December 5, 1901, when the electric motor alone was

* Paper presented at the New Orleans meeting of the Western Gas Association.

used. The results are summarized in the following table:

Kind of motor.	Gas engine.	Electric motor.
Period of use	October 9 to December 11, 1900	October 4 to December 5, 1901.
Total hours machines were run.	697	686
Cost of gas or current used	$106.68	$250.30
Average cost per hour	15.3	36.5

Gas Engines and Steam Power.

A 20 horse-power gas engine that I installed some two years ago has not had any repairs done to it whatever and it has been running constantly nine hours per day. This engine runs a carpenter shop which contains sanding machines, molding machines, planers, &c. This engine consumed from April 1, 1901, to April 1, 1902, 312,200 cubic feet of gas, or 26,000 cubic feet per month. The man who owns this engine says he could not hire a man to turn a grindstone for the money it costs to run the engine. As to comparing the cost of the gas engine with the steam engine, will give the following, which was reported by William F. Ruwell, Philadelphia, who now operates a 13 horse-power gas engine. He formerly used steam at the following cost:

Three months' coal bill, at $24 per month	$72.00
Boy attendant, three months, at $18 per month	54.00
Hauling ashes, three months, at $3 per month	9.00
Total	$135.00

In addition he had boiler inspection, increased insurance and more repairs on boiler and engine than on the gas engine which he afterward installed. Since using the gas engine he gives the expense as follows:

Gas used from November 15 to February 12, 48,600 cubic feet, at $1 per 1000 cubic feet, $48.60. No extra attendant was required, the gas engine having only a few minutes' attention a day to clean and oil same.

A 5 horse-power gas engine that I installed two and a half years ago has not had a single tap of repairs since it was installed, with the exception of one new tube igniter. For the past 12 months this engine has consumed 181,300 cubic feet of gas, an average of 15,100 cubic feet per month, or 36,260 cubic feet of gas per horse-power per year. This engine is doing about its full rated horse-power and is running ten hours per day.

Another engine, a 3.5 horse-power, which runs a printing establishment, for 12 months consumed 11,300 cubic feet of gas, an average of 9275 cubic feet per month, or 31,800 cubic feet of gas per horse-power per year. This engine runs a cylinder press, three job presses, two numbering machines and a 30-inch cutter. Most of these machines are running all the time and 10 hours per day. This engine has had one new set of rings and two new ignition tubes since it was installed, three years ago, this being all the repairs this engine has needed.

Another engine, a 1 horse-power, for 12 months consumed 33,400 cubic feet of gas, an average of 2783 cubic feet per month. This engine has been in constant use over three years in a saloon and is used for compressing air, taking the place of the water pumps. It also runs a bottle washer, and in the summer runs in addition seven fans. The repairs on this engine have not been $10 for the three years.

Another engine, a 20 horse-power, has consumed 407,600 cubic feet of gas in 12 months, an average of 33,970 cubic feet per month, or 20,380 cubic feet per horse-power per year. This engine has been running constantly ten hours per day, but not always on full load, and is used for baling cotton waste, running an elevator and for electric lights. This engine was installed somewhat over a year ago and has needed no repairs to date.

Another engine, a 2 horse-power, which has been running over two years, has consumed in the past 12 months 80,800 cubic feet of gas, an average of 6733 cubic feet per month, or 40,400 cubic feet per horse-power per year. This engine has worked up to its full capacity ten hours per day. The repairs on this engine for the whole time it has been in use amounted to $16.50, and that was for reboring cylinder and furnishing new piston, as they had let the engine run dry and it had cut the cylinder so that it lost its compression.

I find that the hot tube of an engine will consume about 100 cubic feet of gas per month.

Gas Engine Coming to the Front.

The gas engine is slowly but surely coming to the front. Let us go back five years and see how many buildings then had gas engines to make light, run elevators, printing presses, machine shops, exhaust fans, blowers for foundries, planing mills, and, in fact, all kinds of work which is now turned by the gas engine. Most of this has come in the last five years. Why is this? Economy first; next, your engine is ready to go at all times, without waiting to raise steam, and when you shut down your expense of running the plant is stopped at once, and not with a boiler full of steam. Then, again, when your gas engine is started, it requires very little care. A gas engine running ten hours per day can be kept oiled and cleaned by giving it one hour per day. Then, again, take the floor space. With a gas engine you have engine and boiler all in one, and with a steam plant you should have engine room, boiler room and coal shed, with a place to dump ashes. Then, again, with a gas engine you have no leaking steam lines, no packing to blow out and no pumps or injectors to trouble with, while with the steam plant you must have a man to stay with the boiler, shoveling coal and wheeling ashes; you must raise steam to get started and keep it up until stopping time. The gas engine is always ready to go, and when started and oil cups filled, will run without looking after for at least five hours. The gas engine is slowly but surely becoming better understood, and in time is certain to outdo its rivals.

There are several gas engine manufacturers who will guarantee their engines to run on 10,000 B. T. U. per brake horse-power per hour. Now, if your gas contains 650 B. T. U. per cubic foot of gas, it will take 16 cubic feet of gas per brake horse-power to run your engine.

The average gas consumer cannot be expected to give the subject of gas consumption the consideration necessary to determine the advantages of its use, and the gas company should do it and be able to demonstrate its advantages without loss of time or expense to the consumer, and should have employees who could and would assist the consumer in understanding its uses and advantages. I have just sold one of our consumers a 10-horse-power gas engine with a 7.5-kw. dynamo direct connected. This plant will be used for electric lighting in a hotel, for pumping water and to run a cold storage plant.

Now, one word as to the selection of an engine. Don't get a cheap engine and make yourself think you are saving money, for you will not. A poor gas engine is the poorest piece of machinery you can have around, and because there are a great many poor engines on the market, which do not do all the work as they should, and which cause backaches, heartaches and bad words, do not think that all gas engines are alike.

Our gas company set separate meters for gas ranges and we find that our ranges average us 11,000 cubic feet of gas used per year. Now, a 1-horse-power gas engine is worth three ranges to the gas company, a 2-horse-power engine is worth seven ranges, a 3.5-horse-power is worth 10 ranges, a 5 horse-power is worth 16.5 ranges and a 20 horse-power is worth 37 ranges. This is what I find from actual use, and is not guessed at. Now, isn't it well worth while to make an earnest effort to get every gas engine possible connected to our mains?

Information Wanted.—Who manufactures barrels for buffing small nickel work?

Who manufactures the molds used to cast the "Crowfoot" and other styles of battery zincs?

The Delaware River Ship & Engine Building Company, recently organized to take over the Roach shipyard property, at Chester, Pa., have elected the following officers: John B. Roach, president; Osborn Congleton, vice-president; Edward L. Levy, secretary; W. C. Sproule, treasurer, and Daniel E. Ford, general manager.

MANUFACTURING.

Iron and Steel.

In addition to those reported in our issue of last week, the following named concerns have signed the Amalgamated Association scale: American Rolling Mill Company, Middletown, Ohio; Ewald Iron Company, Louisville, Ky.; Washington Charcoal Iron & Tin Mills, Washington, Pa.; Continental Iron Company, Wheatland, Pa.; the Southern Car & Foundry Company, Anniston, Ala.; Parkersburg Iron & Steel Company, Parkersburg, W. Va.; Louisville Bolt & Iron Company, Louisville, Ky.; Republic Works of the National Tube Company, Pittsburgh, Pa.; Kittanning Iron & Steel Mfg. Company, Kittanning, Pa.; Emlyn Iron Works, East Chicago, Ind.; Highland Iron & Steel Company, Terre Haute, Ind.; Kansas City Nut & Bolt Company, Kansas City, Mo.; Tuscora Steel Company, Newcomerstown, Ohio; Phœnix Horse Shoe Company, Joliet, Ill.; South Sharon Tinplate Mill, South Sharon, Pa.; Eagle Horse Shoe Company, South Milwaukee, Wis.; Waukesha Sheet Steel Company, Waukesha, Wis. It was the Frankstown works of the National Tube Company that signed the Amalgamated scale, and not the Youngstown works, as reported.

The new tin plate plant of the Pope Tin Plate Company, at Steubenville, Ohio, has been partially started, 7 of the 12 mills now running on black plate. The other five mills will be started in about a month. This is said to be one of the best equipped tin mills ever built, the mills and engines being extremely heavy.

The engineers and firemen employed in the yards of the Edgar Thomson Steel Works of the Carnegie Steel Company, at Bessemer, Pa,. have demanded an increase in wages from $3 to $3.50 for the engineers and from $2.50 to $3 for the firemen. No reply has been made to the demand, owing to absence of Thomas Morrison, general superintendent.

The Union Chain & Forge Company have been organized by Pittsburgh and Ellwood City capitalists and will build a plant at Ellwood City, Pa., for the manufacture of chain and forgings.

S. Diescher & Sons, consulting engineers, Hamilton Building, Pittsburgh, have completed plans for the plant of the Franklin Rolling Mill & Foundry Company at Franklin, Pa., and are now getting bids for the equipment and buildings. The mill building will be 75 x 330 feet, boiler house 50 x 60 feet, and foundry 100 x 300 feet, all of steel construction. The power house will be equipped with a 600 horse-power engine, 600 horse-power boilers, heaters, pumps, &c. There will also be a 200 horse-power electric plant installed. The rolling mill will contain three stands of three-high 18-inch mills. The other equipment will consist of bolt cutting machinery, nut tapping machines, cold cutting saws, small hand crane, pulleys, shafting, shears, roll lathes and foundry equipment. Also a 50,000-gallon water tank.

The Whitaker Iron Company, Wheeling, W. Va., manufacturers of black and galvanized sheets, are adding three more sheet mills to their plant, which will give them a total of 11.

The Chillcott-Evans Chain Company, Allegheny, Pa., are adding 10 additional fires to their plant. This concern have 40 forges in operation at present, and have orders on their books to keep them running for a long time. They recently turned out some very heavy cable chains, for the manufacture of which they have special facilities.

The rod mills in the South Side works of the American Steel & Wire Company, at Pittsburgh, have been closed down and will be extensively repaired and the capacity increased.

Dispatches from Troy, N. Y., state that the property of the Troy Steel Company will be sold at auction at the City Hall, Albany, August 7 to satisfy judgment in favor of the Guaranty Trust Company of New York, as trustee of the bondholders. The plant has been idle for some time.

Newspaper reports from Roanoke, Va., state that Drake, Bartow & Co. of Cleveland had purchased the plant of the Roanoke Furnace Company, and would make extensive improvements and alterations. The Cleveland firm inform us that there is no foundation for these reports. Some time ago they made a proposition to purchase the Roanoke furnaces, but it was not accepted, and the deal is off so far as they are concerned.

The Ohio Steel & Iron Specialty Company of Cuyahoga Falls, Ohio, are installing an open hearth furnace and are remodeling their present mill. Plans for the improvements are being prepared by the Garrett-Cromwell Engineering Company of Cleveland and contracts will be let for same in a short time. The improvements include a 25-ton furnace with facilities for casting small ingots. Additional rolling capacity will be installed to roll the ingots into finished bars.

The United Engineering & Foundry Company of Pittsburgh are building at their Lloyd Booth department, Youngstown, Ohio, a large hydraulic shear for the La Belle Steel Company, at Steubenville, Ohio. The shear was designed by S. V. Huber & Co., consulting engineers, of Pittsburgh, and stands 22 feet high, and has a width of 15 feet, weighing complete 15 tons. It works with a water pressure in the main cylinder of 1500 pounds to the square inch, which will give a total pressure of 750 tons on the ram. The cylinder is 3 feet in diameter and the maximum stroke is 21 inches. The top knife is stationary, while the bottom knife is movable, an adjustment being provided for raising and lowering the top knife so that thin slabs or thick blooms may be sheared with a minimum travel of the lower knife block. The work of assembling the shear is almost completed, and it will probably be shipped next week.

The Standard Welding Company of Cleveland are breaking ground for an addition 60 x 130 feet and one story high. The company are installing tube cutting machinery and several additional draw benches, increasing their facilities for producing steel tubing fully 50 per cent. They are also installing what is claimed to be the largest electric welding machine in the country. It is capable of welding articles having cross section up to 12 square inches, and it is equipped with hydraulic apparatus capable of exerting a pressure of 35 tons. New machine tools will also be installed.

General Machinery.

Machinists of the West End, Duluth, Minn., are organizing a co-operative shop, plans for which are now under way. Lawrence J. Willner is interested.

The Petersburg Iron Works Company of Petersburg, Va., manufacturers of cast iron cannon balls and builders of dredges, harbor machines, &c., will probably remove their plant to a point on the James River just below Richmond, where they have a site suitable for the erection of works much larger than the present quarters, which have become too cramped to take care of their increasing business.

The Branson Machine Company of Philadelphia are having plans prepared for a four-story addition, 20 x 100 feet, to their plant at 506 North American street.

The Lunkenheimer Company have recently purchased a large number of Westinghouse induction motors for the equipment of their new works at Cincinnati, Ohio.

The North Chicago Machinery Company, Chicago, is the name of a new corporation with a capital of $25,000. The company were organized for the purpose of manufacturing machine specialties, and the incorporators are Chas. O. Shervey, Harry Bitner and Russell Wiles.

The Hill Tool Company, Anderson, Ind., say that business for the last six months has been very good, both domestic and foreign, they having received many nice orders from the European countries, Australia, Japan and a number of the South American countries. Their plant has been taxed to its full capacity.

The St. Louis & San Francisco Railroad Company advise us that they intend to make extensive improvements to their shops and yards at Fort Scott, Kan., the cost of which will be about $100,000.

The Safety Emery Wheel Company of Springfield, Ohio, will erect a new machine shop, 60 x 112 feet, and an addition to the emery wheel department, 50 x 120 feet.

Stockholders of the Krastin Automobile Company have taken steps to secure the building of a factory of considerable size. They will purchase about $10,000 worth of machine tools immediately for use in their present buildings.

The Canton Foundry & Machine Company, Canton, Ohio, have bought the Universal Machine Company, and are erecting a large machine and pattern shop and are also enlarging their foundry in order to take care of their increased business. They will continue to manufacture conductor pipe, eave trough, wire eave trough hanger and all kinds of special machinery and job castings of all kinds in gray iron, also all kinds of job machine work. They will also carry a large stock of all sizes of shafting, hangers and couplings, and are agents for Stark County for the Dodge pulleys and will carry a large stock.

Press dispatches state that the Pennsylvania Railroad Company have officially announced their intention to build large steel car repair shops at Altoona, Pa., to cost about $200,000.

The Standard Tool Company of Cleveland, manufacturers of drills of all kinds, are commencing work on an addition to their plant. It will be 48 x 120 feet, three stories high. It will be used in their regular line of manufacture.

Complete machine shop and foundry equipment will be required by the recently incorporated Morse Petroleum Gas Generator Company of Pueblo, Col., who intend to erect a plant for the manufacture of a device for burning oil on locomotives, steamships, &c. They also expect to establish branch establishments nearer the oil fields and where oil is used as fuel. The main feature of the invention is that it generates gas from the petroleum, which the company claim is a great improvement over common spray burners. Experimental operations will be conducted in competition with other burners in Washington under the auspices of the United States Navy for use on steam vessels. For the present address Charles B. Phillips, 215-216 Central Block.

The business of Kraeuter & Co., Newark, N. J., who have been manufacturing small machinists' tools of all kinds since 1860, has been taken over by Arthur A. Kraeuter, son of August Kraeuter. The new proprietor will greatly enlarge the business and extend the lines of manufacture.

In connection with their immense plant already partially in operation, the Wellman-Seaver-Morgan Engineering Company of Cleveland are preparing plans for an office building to be erected adjoining the new plant. It will be unique in that it will be at

least nine stories high. When completed, all the offices of the company will be located there. The company are making plans for two more foundries to be erected next year in addition to the large foundry which is well under way.

Boilers, Engines, &c.

John W. Hays of Petersburg, Va., engineer in charge of electric light plant at Dunn, N. C., is in the market for two 50 horse-power boilers, a 70 horse-power engine, and 30,000 feet of 4, 6 and 8 inch cast iron bell and spigot pipe.

It is stated that a company in which Theodore Tunis, Merchants' Bank Building, Baltimore, Md., is interested, propose to build an electric power plant at Berkeley, Va.

The Reliance Gauge Column Company, Cleveland, Ohio, advise us that in the past two years their business has been fully double that of any other similar period in the company's history, while the present outlook is very promising. The demand for Reliance steam specialties is steadily increasing, the company having definite contracts covering deliveries many months ahead.

Cass Harkins, a well known manufacturers' agent and consulting engineer, who has been in business in Columbus, Ohio, for a number of years, has been appointed sole agent for Central Ohio for the We-Fu-Go and Scaife water softening and purifying systems, manufactured by Wm. B. Scaife & Sons Company of Pittsburgh, Pa.

The Union Iron Works of Oshkosh, Wis., under the direction of H. C. Doman & Co., proprietors, contemplate the erection of a new plant for the manufacture of gas engines and general foundry work, which will cost about $30,000. The machine shop will be 48 x 208 feet, and a separate structure will be erected and equipped for the foundry and pattern shop, which will be 40 x 208 feet in dimensions.

The Ashcroft Mfg. Company, 85-89 Liberty street, New York, are advised that the Tabor steam engine indicator has been adopted by the Philippine Insular Government on 15 class "A" cruisers.

The Metropolitan injector, manufactured by the Hayden & Derby Mfg. Company, 85-89 Liberty street, New York, has been adopted by the Philippine Insular Government and 15 cruisers have been fitted with it. The contract was secured by F. W. Horn & Co., Yokohama, Japan, who are the agents for the Hayden & Derby Mfg. Company in the Far East.

The Pierce Engine Company of Racine, Wis., are contemplating an addition to their plant which will be 60 x 100 feet.

The Muncie Gas Engine & Supply Company of Muncie, Ind., expect to greatly enlarge their shops to meet the demands of their rapidly increasing business.

The Davis Gasoline Engine Company, Waterloo, Iowa, have increased their capital stock to $200,000, and the name of the firm has been changed to the Cascaden Mfg. Company.

The heavy demand for the White Star oil filter, manufactured by the Pittsburgh Gage & Supply Company, Pittsburgh, Pa., is shown in recent sales covering every section of the country as follows: Rockingham County Light & Power Company, Portsmouth, N. H.; Nashville Electric Light Company, Nashville, Tenn.; Hamburg Railway Company, Blaisdell, N. Y.; P. R. Mitchell Company, Cincinnati, Ohio; Superior Electric Light Company, Superior, Neb.; Kankakee Water Supply Company, Kankakee, Ill.; Carnegie Tube Company, Carnegie, Pa.; Silver King Mfg. Company, Park City, Utah; Seattle Electric Light Company, Seattle, Wash.; Army & Navy Hospital, Hot Springs, Ark.

The deal for the purchase of the Buckeye Engine Company plant, at Salem, Ohio, by Cleveland and New York capitalists is off, the option having expired and was not renewed. The Buckeye Engine Company will continue to operate the works, and have a large number of orders on hand.

Baldwin and Pennington, Baltimore, Md., are preparing plans for a central heating plant for the State buildings at Annapolis, Md., to cost $150,000.

G. A. Myers of Massillon, Ohio, has secured a contract to furnish electric light in the village of Navarre. He will buy an engine, generator and boiler.

Water Works Trustees of Paulding, Ohio, have called for proposals on two 750,000-gallon compound pumping engines with suitable boilers; also for 347 tons of iron pipe, valves, hydrants, &c.

T. C. Hatton of Wilmington, Del., is preparing plans for an electric light plant and water works for Pennsgrove, N. J. Jno. P. Leop is chairman of commission.

Considerable equipment will be required for the electric light plant the city of Tallahassee, Fla., will build at a cost of about $20,000, plans for which are under way. Louis C. Yaeger is chairman of commission.

Hyde Bros. & Co., Lewis Block, Pittsburgh, have received a contract for the installation of a boiler plant at the works of the Guelph Iron & Steel Company, at Guelph, Ontario, Canada. This firm have under erection at present contracts calling for more than 5000 horse-power boilers.

The Edgar S. Low Company of Pittsburgh have been incorporated with a capital of $50,000 for the purpose of continuing the business of Edgar S. Low, dealer in new and second hand saddle tank locomotives, railroad and contractors' supplies. Edgar S. Low has been elected president, W. M. Simmons, secretary, and J. M. Shea, master machanic.

Fires.

Fire visited the Racine Wagon & Carriage Shops at Racine, Wis., July 2, causing damage to the extent of $2000, fully covered by insurance. The blaze started in the blacksmith shop, but was checked before much damage was done.

The Lang & Goodhue Company, Burlington, Vt., machinists and founders, suffered a $20,000 loss by fire at their plant last week.

The Manston Foundry, Manston, Wis., was recently destroyed by fire, entailing a loss of about $6000.

The plant of the Londonderry Iron Works, Londonderry, N. S., which is owned by the Montreal Rolling Mill Company, was destroyed by fire last week. They had several large contracts on hand and the rolling mills were run night and day.

The works of the Marion Acetylene Gas Company, at Marion, Mass., were wrecked by an explosion, followed by a disastrous fire July 10.

The plant of the Thomas Wrigley Machine Works, Paterson, N. J., was damaged $10,000 by fire July 11. Most of the loss is on machinery.

The four-story brick foundry of Josiah Thompson & Co., Philadelphia, Pa., was destroyed by fire July 15. Valuable patterns and machinery were rendered useless, the loss being estimated at about $100,000.

Foundries.

The Scullen-Gallagher Iron & Steel Company, St. Louis, Mo., have the large addition to their foundry completed and expect to put it in operation this week.

The Union Steel Casting Company of Pittsburgh will make some extensive additions to their plant which will very much increase their capacity for the manufacture of steel castings. They recently furnished a large number of steel castings for one of the United States cruisers. The company have just paid a quarterly dividend of 3 per cent. on their capital stock of $200,000.

The Ohio Malleable Iron Company of Columbus, Ohio, commence operations July 18 in their new plant now being completed. Their new malleable iron foundry will have a capacity of 35 tons per day. The main foundry building, already completed, is 70 x 260 feet, and the annealing room is 65 x 225 feet and is covered with sheet iron. All the latest appliances are employed in the new plant, which is well situated for good shipping facilities. J. H. Rodgers is president and treasurer, F. K. Newman, vice-president and general manager, and H. N. Smith, secretary.

Buildings and Bridges.

The A. M. Blodgett Bridge Company of Kansas City, Mo., have been awarded the contract for the construction of 20 steel bridges over the water courses of Macon County, Ga.

Hardware.

The Phœnix Horseshoe Works of Joliet, Ill., have completed the construction and equipment of their works which were destroyed by fire some time ago; the plant is now in operation.

The Helm Mfg. Company of Jacksonville, Ill., is the name of a new corporation recently organized with a capital of $25,000, with $20,000 paid up, for the purpose of manufacturing all grades of swings, step ladders, &c. They are also in the market for ⅝ and ½ inch common black pipe and rod iron. The plant will employ about 35 people when in running operation.

The Western Wire & Bale-Tie Company of Kansas City, Mo., have been incorporated with a capital of $100,000, under the name of the Western Steel & Wire Company. The directors are: Arthur H. Symons, chairman; Roy A. Henley, J. Henley Symons, John H. Kane and Frank D. Parrent. The company will manufacture plain wire, bale ties, woven wire fence, and steel wire springs. The main office will be in Chicago and arrangements have been made to build a wire-drawing and galvanizing plant in that vicinity. The Kansas City business, however, will be continued as heretofore, with the new products added, a tract of land in the West Bottoms having recently been purchased on which it is contemplated to build a warehouse 65 x 200 feet.

The Haish Wire & Implement Company, De Kalb, Ill., have been incorporated with a capital of $100,000 by Jacob Haish, C. H. Salisbury and B. S. White.

Business with Holroyd & Co., manufacturers of stocks and dies, Waterford, N. Y., has been exceptionally good. They have added a large amount of new machinery to their plant during the past six months, and contemplate purchasing a number of new machines in the near future.

The Coldwell Lawn Mower Company, Newburgh, N. Y., have awarded the contract for the construction of a brick addition to the north end of their works. The addition will be 50 x 85 feet in size and three stories in hight. It is expected to have the new structure complete and ready for use by next October. When this addition is completed the company will have an especially large and well appointed plant. The main building of the factory at present is 50 x 150 feet in area, with a wing extending 60 feet longer. There is also another building having 135 feet frontage.

J. S. Patterson and others of Findlay have bought up the interest in the Findlay Axe & Tool Company of Findlay, Ohio, formerly owned by R. M. Abbott. Mr. Abbott, who died a short time ago, was superintendent and one of the largest stockholders of the plant. The deal will make no change in the management of the business.

Miscellaneous.

The F. Meyer & Bros. Company, Peoria, Ill., manufacturers of the Handy furnace pipe, have let the contract for rebuilding the part of their plant which was recently burned. Three motors will be all the new machinery required, and these have been purchased.

The David Bradley Mfg. Company of Bradley, Ill., are contemplating the erection of a three-story building 80 x 200 feet, to increase their facilities for the manufacture of plows. The building will cost about $35,000.

A two-story building of brick and stone, 47 x 162 feet, is under course of construction by the Elkhart Brass Mfg. Company of Elkhart, Ind. Brass, iron and wooden specialties will be manufactured, and the company anticipate the opening of their factory by September. The company consists of A. E. Hansen, president and manager; W. H. Anderson, secretary, and F. A. Reed, treasurer.

The C. R. Wilson Carriage Company, Detroit, Mich., have plans for a three-story and basement brick factory 75 x 175 feet in size, which will be built at a cost of about $15,000.

The Michigan Fence Post Company, Capac, Mich., are erecting an addition to their plant, which will be 50 x 120 feet, with an engine room 16 x 40 feet. Concrete mixers, elevators and all other apparatus and machinery used in cement construction work will be included in the equipment. Machinery for making wire shapes and angle iron of hoop steel will be the principal machinery installed. They anticipate the completion of the plant by September.

The Mueller Mfg. Company of Decatur, Ill., are erecting a new warehouse and office building. They manufacture water and gas specialties.

A stock company have been organized in Detroit, Mich., with a paid-up capital of $20,000 to manufacture galvanized iron tanks and steam cooking stoves. The factory of Freeland & Sons of Middlebury, Ind., was purchased by the company, and the buildings will be moved to Detroit, thus securing better shipping facilities. The factory will employ about 75 hands.

Contracts have been let for the new buildings of the Krein Company, who will establish a factory at Wapakoneta, Ohio, for the manufacture of acetylene gas generators.

W. H. Meacham of Toledo, Ohio, superintendent of the Miami & Erie Canal Company, is having plans prepared to erect a steel aqueduct to carry the canal across the St. Mary's River.

The Toledo Safe & Lock Company, Toledo, Ohio, will commence this week in their new plant just being completed. The building is on the Ann Arbor & Toledo Terminal Company's tracks, and it is 50 x 300 feet. The company are now prepared to furnish 26 patterns of safes. Mr. Schwab, who for many years manufactured safes at Fostoria, is at the head of the new factory.

The American Vapor Stove Company are breaking ground for a large brick addition to the Dangler stove factory in Cleveland.

The United Coal & Coke Company, an identified interest of the H. C. Frick Coke Company of Pittsburgh, have let contracts for the building of about 300 houses in the Pocahontas coal fields in West Virginia, which are to be developed, contracts for the building of 3000 coke ovens of the beehive type having been placed some time ago. Two hundred of these houses will be built at Wilcoe, named in honor of William Coe, engineer of bridges on the Norfolk & Western Railroad, and 100 at Gary, named in honor of Judge E. L. Gary, chairman of the United States Steel Corporation.

Sidney Shepard & Co. of Buffalo have filed plans for the erection of a $45,000 building in Buffalo, where the company now has two plants. The company manufacture sheet iron goods. The new building will be a six-story structure, and it is understood the company's business will be concentrated in it on completion.

M. Harmet, engineer in chief at the steel works at St. Etienne, France, proposes a new furnace for the production of iron by electricity.

PERSONAL.

H. M. Whitney of Boston, who was for so many years associated with the Dominion Coal Company, and later with the Dominion Iron & Steel Company of Sydney, has returned from a six months' stay in Europe, much benefited in health.

Theodore Geissmann, Monadnock Block, Chicago, has been appointed exclusive sales agent for the Cuyahoga Wire & Fence Company for Chicago and suburbs.

At Pittsburgh W. A. Dinker has resigned his position of general purchasing agent of the Pittsburgh Coal Company, and will soon sail for Europe. His successor has not been appointed.

Henry W. Oliver of Pittsburgh has bought another parcel of real estate in that city, for which he paid $100,000. Mr. Oliver is one of the largest holders of realty in Pittsburgh and owns an entire block fronting on Smithfield street, and another on Wood street. He will erect next year a very large office building on his Wood street holdings.

W. E. Taylor of Youngstown, Ohio, has purchased a controlling interest in the Niles & Scott Wheel Company, Laporte, Ind.

Edward R. Slagle, heretofore acting manager of the Pullman Company, has been appointed manager of the Pullman Car Works. The appointment, which was made by General Manager Geo. F. Brown, went into effect July 1.

Geo. E. Day has been appointed secretary and general sales agent of the Youngstown Iron, Sheet & Tube Company, succeeding W. H. Foster.

Robert D. Kuhn, for many years manager of the Park Steel Company's interests at Chicago and Cleveland, Ohio, has been appointed special agent of the Crucible Steel Company of America, with headquarters at Frick Building, Pittsburgh.

Erskine Hewitt, a son of Abram S. Hewitt, W. B. Leeds, James A. Burden, Jr., and James Gayley are reputed to be interested in the Windsor Trust Company, which is to be established at Fifth avenue and Forty-seventh street, New York.

James M. Swank, general manager of the American Iron and Steel Association, celebrated his birthday on the 12th inst. Mr. Swank attained the age of 70 years on that date, and is to be congraulated on the possession of exceptional health and vitality, which enable him to continue to discharge his exacting duties with so much credit to himself and gratification to the iron trade. He is now serving the thirtieth year of his connection with the association.

L. M. Ekin has been elected secretary of the Huntington Tin & Planished Plate Company, Huntington, W. Va.

E. S. Mills, for some years representative of the Carnegie Steel Company at Cleveland, Ohio, has been appointed assistant to James Gayley, first vice-president of the United States Steel Corporation. A. F. Harvey succeeds Mr. Mills, with offices in Duluth, Minn.

Frank N. Hoffstot, president of the Pressed Steel Car Company, has returned to Pittsburgh from a visit to Europe. The return of Mr. Hoffstot has given rise to the report that the interests of the Pressed Steel Car Company and the American Car & Foundry Company will be consolidated, but the report is denied by officials of both concerns.

George Westinghouse of Pittsburgh has been elected an honorary fellow of the American Association for the Advancement of Science, an honor conferred upon very few men in the history of the association.

C. L. Fairfield has resigned the management of the Canton Crucible Steel Company, Canton, Ohio, and returned to his home in Pittsburgh.

J. M. Butler has resigned the position of secretary of the Inland Steel Company of Chicago.

The Iron and Metal Trades.

The Foundry Iron markets continue to suffer from the scarcity which has characterized this branch for some time past. The Birmingham furnaces, it is true, are resuming, but it will take some time before they are again up to capacity and are making the regular grades. The Lehigh Valley is under constant pressure on account of the Anthracite strike, while in the Central West furnaces are blowing out because of scarcity of Coke. The Pig Iron famine, it would seem, will dominate the whole industry for some time to come, and must have its decided influence upon the supply of Steel also.

There has been a fair movement of Pig Iron for forward delivery. There have been sales of this character of Foundry Iron in Chicago, of 20,000 tons of Malleable Bessemer at Pittsburgh, and of 10,000 tons of Basic at Pittsburgh.

Another movement is under way to consolidate the merchant furnaces of the Central West and options on a number of the most important plants have been secured. The future of the individual merchant furnaces, should there be a falling off in the demand, is calculated to make co-operation an end to be desired.

Steel Billets are easier, partly because of the lower prices at which Foreign Steel is being offered and partly because of resales. Chicago reports sales of 4000 tons of Foreign at $31 to $31.25.

It appears that the published reports of the sales for 1903 effected by the Steel Rail mills have been somewhat exaggerated. We are advised on the best of authority that thus far they aggregate 850,000 tons, not including the Pueblo mill, concerning whose commitment little is known.

Reports relative to the Plate trade are extremely favorable, and some of the mills are taken care of now into the second quarter of next year. Some good additional orders have been placed.

The Structural branch is in an extraordinary position and business continues to roll in. It is estimated that about 60,000 tons of railroad bridge work has been booked for delivery during the second, third and fourth quarters of 1903. This includes two large orders, one for 23,000 tons and another for 14,000 tons. An interesting contract taken this week is for an enormous power house at St. Louis to be built by the Amalgamated Lighting and Traction companies of that city, who are getting ready for the Fair. Another large power plant for which the Structural material has been placed is that at Brunot Island, near Pittsburgh.

From the Wire industry come reports of a good demand from manufacturing customers. An interesting series of transactions is the closing of season contracts for Weaving Wire for Wire Cloth. About 6000 tons has been placed, the annual consumption of the country ranging between 8000 and 9000 tons.

During the current week there will probably be some interesting developments in the Tin Plate trade, which may affect importations.

Spelter at the present time is the banner metal. The advance has continued until 5 cents at St. Louis is within touch. Copper is easing off.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one month and one year previous.

	July 16, 1902.	July 7, 1902.	June 18, 1902.	July 17, 1901.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	**$22.50**	$22.75	$21.50	$14.75
Foundry Pig No. 2, Southern, Cincinnati	**20.75**	20.75	20.50	12.75
Foundry Pig No. 2, Local, Chicago	21.50	21.00	21.50	15.00
Bessemer Pig, Pittsburgh	**21.75**	21.25	21.50	16.00
Gray Forge, Pittsburgh	**21.00**	21.00	20.00	13.50
Lake Superior Charcoal, Chicago	**25.00**	25.00	24.00	17.50
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	*31.50*	31.25	32.00	24.00
Steel Billets, Philadelphia	29.50	29.50	30.00	26.50
Steel Billets, Chicago	31.25	....	....	....
Wire Rods, Pittsburgh	*36.00*	36.00	37.00	36.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
Spikes, Tidewater	2.00	2.00	2.00	1.80
Splice Bars, Tidewater	1.90	1.90	1.90	1.50
OLD MATERIAL:				
O. Steel Rails, Chicago	18.50	18.50	18.50	13.00
O. Steel Rails, Philadelphia	21.00	21.00	21.25	15.75
O. Iron Rails, Chicago	24.00	24.00	24.00	18.50
O. Iron Rails, Philadelphia	24.50	25.00	24.50	19.00
O. Car Wheels, Chicago	21.00	21.00	20.50	16.50
O. Car Wheels, Philadelphia	20.50	20.50	20.00	17.50
Heavy Steel Scrap, Chicago	19.00	19.00	19.00	12.50
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.95	1.95	1.95	1.55
Common Iron Bars, Chicago	1.75	1.75	1.75	1.55
Common Iron Bars, Pittsburgh	1.80	1.75	1.80	1.45
Steel Bars, Tidewater	2.00	1.90	1.95	1.60
Steel Bars, Pittsburgh	1.60	1.60	1.60	...
Tank Plates, Tidewater	2.00	2.00	2.00	1.75
Tank Plates, Pittsburgh	1.75	1.75	1.80	1.60
Beams, Tidewater	**2.35**	2.25	2.10	1.75
Beams, Pittsburgh	2.00	*1.60	1.60	1.60
Angles, Tidewater	**2.35**	2.25	2.00	1.75
Angles, Pittsburgh	2.00	*1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh	2.15	2.10	2.15	1.85
Skelp, Sheared Iron, Pittsburgh	*2.20*	2.15	2.35	1.90
Sheets, No. 27, Pittsburgh	2.90	2.90	2.90	3.20
Bark Wire, f.o.b. Pittsburgh	2.90	2.90	2.90	2.90
Wire Nails, f.o.b. Pittsburgh	2.05	2.05	2.05	2.30
Cut Nails, Mill	2.05	2.05	2.05	2.00
METALS:				
Copper, New York	*11.95*	12.00	12.25	17.00
Spelter, St. Louis	**5.00**	4.90	4.75	3.80
Lead, New York	4.10	4.10	4.10	4.37½
Lead, St. Louis	3.97½	3.97½	3.97½	4.27½
Tin, New York	**28.80**	28.25	28.75	27.25
Antimony, Hallett, New York	8.25	8.37½	8.00	8.75
Nickel, New York	50.00	50.00	50.00	60.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	4.19	4.19	4.19	4.19

* Official quotations.

Chicago

FISHER BUILDING, July 16, 1902.--(*By Telegraph.*)

The freight handlers' and teamsters' strike has been responsible for the curtailment of business, especially in such lines as are dependent upon shipment from local stocks, but aside from this depressing influence the general features of the market have been unchanged. In Pig Iron the continued active demand for Foundry Iron for next year's delivery has developed even a stronger tone, but prices have not changed essentially, although reports are circulated that an advance of $1 per ton is being considered by Southern furnaces at the close. Quite considerable business has been done, however, in Southern Iron on the basis of $17 for No. 2 Foundry, Birmingham. There is no relief from the scarcity of Iron either for immediate shipment or for delivery during any part of the current year. A strong effort is being made to advance the price of Bar Iron, but up to the present time there has been little more than a steadying of the market. An attempt was made during the week to consolidate ten of the independent Bar Iron mills with a capital of $6,000,000, but the refusal of some of the mills to enter the combine has resulted in an abandonment of the enterprise, at least temporarily. Most of the business has been done on the basis of 1.75c. to 1.80c., but 1.85c. is being asked at the close. The demand for Structural Material continues quite active; contracts involving about 2000 tons have been placed during the week for next year's delivery. There has been less activity in Heavy Rails, at least as far as the placing of further large contracts is concerned, the only sale of moment being for 12,000 tons. A break in the prices of foreign Billets has resulted from freer offerings from abroad and resales by domestic consumers. Between 4000 and

5000 tons have been sold, ranging from $31 to $31.25, Chicago, and other sales of 1000 to 5000 tons are pending. Old Material continues as scarce and firm as ever.

Pig Iron.—The continued demand for Iron for next year's delivery is the feature of interest, but the center of activity has been transferred to the Southern companies from Northern stacks, although Northern Iron is still in demand. No very large sales have been made during the week, but in an aggregate between 20,000 and 25,000 tons have been sold on the basis of $17, Birmingham, for No. 2 Foundry, delivery extending from January to June, 1903. Individual sales have been in lots of 10,000, 4000, 3000 and several lots ranging from 1000 to 2000 tons each. Other large buyers, such as car works, agricultural implement manufacturers and stove founders, have been making urgent inquiries for lots of 2500 to 3000 tons each, with the prospect favorable for the closing of one or two of these deals before the week is out. A few lots of Southern Nos. 1 and 2 Foundry have been sold at $24.65 and $23.65, respectively, for November and December delivery, and a few 100-ton lots of No. 1 Southern Foundry to be shipped in July at $25.65. As a rule, however, scarcely anything is obtainable for prompt shipment or for delivery during the current year. Resales continue to be made at from $2 to $3 per ton premium over quotations, but even these transactions are becoming rare. An advance of $1 per ton on Southern Iron is being considered. The number of buyers inquiring for considerable tonnage of Iron for delivery during the last quarter of the current year is inceasing, and they seem to be surprised to find no appreciable amounts available for such delivery. The following are the nominal quotations for delivery during the current year:

Lake Superior Charcoal	$25.00 to $26.00
Local Coke Foundry, No. 1	22.00 to 22.50
Local Coke Foundry, No. 2	21.50 to 22.00
Local Coke Foundry, No. 3	21.00 to 21.50
Local Scotch, No. 1	22.50 to 23.00
Ohio Strong Softeners, No. 1	24.00 to 25.00
Southern Silvery, according to Silicon	24.65 to 25.15
Southern Coke, No 1	24.15 to 24.65
Southern Coke, No. 2	23.65 to 24.15
Southern Coke, No. 3	23.15 to 23.65
Southern Coke, No. 1 Soft	24.15 to 24.65
Southern Coke, No. 2 Soft	23.65 to 24.15
Foundry Forge	22.65 to 23.15
Southern Gray Forge	22.65 to 23.15
Southern Mottled	22.65 to 23.15
Southern Charcoal Softeners, according to Silicon	23.00 to 24.00
Alabama and Georgia Car Wheel	26.50 to 27.00
Malleable Bessemer	23.00 to 23.50
Standard Bessemer	24.00 to 24.50
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	25.10 to 26.15

Bars.—There has been less pressure in the Bar Iron market and considerable inquiry, resulting in sales aggregating about 5000 tons, but most of the individual transactions have been for relatively small amounts. There seems to be less disposition to shade prices, and the market closed steady at 1.75c. to 1.80c.; for small lots, 1.85c. is asked. There has been a fair movement in Soft Steel Bars, new orders being received in fair amounts for this season of the year. Specifying on old contracts has been quite liberal. Prices continue firm at 1.75c. to 1.90c.; Hoops have been unchanged at 2.10c. to 2.25c., and Angles, 2.25c., base, mill shipment. The demand from store has been active, but shipments have been light because of the strike of the freight handlers and teamsters. Soft Steel Bars are offered at 2c. to 2.25c.; Angles at 2.50c., and Hoops at 2.50c., base, from store.

Structural Material.—There continues to be considerable inquiry, especially for Beams, Channels, Zees, Angles and Tees. The tonnage placed during the week for next year's delivery, including one or two orders pending, will aggregate about 20,000 tons. Business in foreign Steel seems to be insignificant for the moment. Domestic Steel, mill shipment, is quoted as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c. Small lots of Beams and Channels from local yards are quoted at 2.50c. to 3.50c.; Angles, 2.50c. to 3.50c. rates; Tees, 2.55c. to 3.50c. rates.

Plates.—The market is without special feature other than that the strength that has characterized it for many weeks is less evident. There is a good demand, which would be more active if there were any encouragement from the mills, which are still heavily oversold. Where it is possible to make early shipment $4 or $5 per ton premium is obtained over official quotations, which are nominally as follows: Tank Steel, ¼-inch and heavier, 1.75c. to 2.25c.; Flange, 1.85c. to 2.35c.; Marine, 1.95c. to 2.50c. The demand for shipment from local warehouses has continued urgent, but the freight handlers' strike has allowed but little movement. Prices are, however, unchanged, as follows: Tank Steel, ¼-inch and heavier, 2.30c. to 2.50c.; Tank Steel, No. 8, 2.45c. to 2.55c.; Flange, 2.40c. to 2.75c., all f.o.b. warehouse, Chicago.

Sheets.—The market has continued slow and easy for Light Sheets, but Heavy Sheets have continued steady. Quotations are unchanged, as follows: No. 27, Black Sheets, 3.15c. to 3.25c., Chicago, for mill shipment, while small lots from store are quotable at 3.45c. to 3.55c. Galvanized Sheets, mill shipment, are offered at 4.45c. to 4.50c., with discounts of 75c. and in some cases even greater, but small lots from store are held at 4.70c. to 4.75c. for No. 27.

Cast Pipe.—There have been no public lettings of moment during the week, but one or two municipal contracts will be placed within the next few days. The largest transaction which has been consummated is for 600 tons, small sizes up to 12's, to be delivered at Whatcom, Wash. There has continued to be a fair demand for small quantities of small sizes running from 4 to 8 inches from water and gas companies. The market continues firm in sympathy with Pig Iron, but prices are unchanged, manufacturers quoting Cast Iron Water Pipe as follows: 4-inch, $34.75; 6-inch, $33; 8-inch and upward, $32; Gas Pipe, $1 per ton higher than Water, f.o.b. Chicago.

Merchant Pipe.—The market has been without special activity, but a firm tone has continued to prevail. Carloads are quoted as follows, random lengths: Black, ⅛ to ½ inch, 56½ off; ¾ to 12 inches, 63½ off; Galvanized, ⅛ to ½ inch, 43½ off; ¾ to 12 inches, 50½ off.

Boiler Tubes.—A steady market with a moderate degree of activity has been experienced throughout the week. Prices for mill shipment are as follows:

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2½ inches	55½	38
2¾ to 5 inches	61	48
6 inches and larger	55½	38

The demand from store has fallen off, but prices have continued firm as follows:

1 to 1½ inches	35	35
1¾ to 2½ inches	47½	32½
2¾ to 5 inches	55	42½
6 inches and larger	47½	..

Merchant Steel.—A fair order demand has been experienced for nearly all kinds of Merchant Steel with possibly the exception of Tire Steel, and full prices have been readily obtained. Mill shipments are quoted as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 50 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 7c. for mill shipments; specials, 12c. upward.

Rails and Track Supplies.—While there has been considerable inquiry for Heavy Sections the week has been productive of only small sales, the largest being about 12,000 tons. The official quotation remains $28 at the mill for Heavy Sections. There has been quite an active inquiry for Light Sections, with the current make of the local mills readily disposed of, prices ranging from $35 to $40. Track Supplies have continued firm, with a good demand. Fastenings are quoted in carload lots: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Billets.—The feature of the week has been the freer offering of foreign Steel, both direct from abroad and reofferings by domestic mills of previous purchases. The result has been a drop of $1 to $1.50 per ton, sales of 4000 tons having been made at about the equivalent of $31.25, Chicago, for early shipment. Domestic Billets, however, have been in only moderate supply and well sustained, there being still considerable complaint of the light deliveries on previous contracts. Small sales continue to be made on the basis of $35 to $38 for carloads, smaller quantities selling up to $40, according to the buyer, analysis and time of delivery.

Old Material.—The market has ruled very strong, with a tendency toward even higher prices. Sales made during the week in a few 100-ton lots have been at the following quotations per gross ton:

Old Iron Rails	$24.00 to $25.00
Old Steel Rails, mixed lengths	18.50 to 19.50
Old Steel Rails, long lengths	23.50 to 24.50
Heavy Relaying Rails	32.00 to 33.00
Old Car Wheels	21.00 to 22.00
Heavy Melting Steel Scrap	19.00 to 20.00
Mixed Steel	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates	$22.00 to $23.00
Iron Car Axles	25.00 to 26.00
Steel Car Axles	23.00 to 23.50
No. 1 Railroad Wrought	21.00 to 21.50
No. 2 Railroad Wrought	18.50 to 19.00
Shafting	19.00 to 20.00
No. 1 Dealers' Forge	16.50 to 17.00
No. 1 Busheling and Wrought Pipe	14.50 to 15.50
Iron Axle Turnings	14.50 to 15.00
Soft Steel Axle Turnings	14.00 to 14.50
Machine Shop Turnings	13.75 to 14.25
Cast Borings	9.25 to 9.50
Mixed Borings, &c	9.50 to 10.25
No. 1 Boilers, cut	14.50 to 15.00
Heavy Cast Scrap	14.50 to 15.00
Stove Plate and Light Cast Scrap	11.00 to 11.50
Railroad Malleable	16.25 to 16.75
Agricultural Malleable	.... to 15.00

Metals.—Because of the difficulty of moving freight of any kind the market has been very quiet, but prices have been without essential change. Lake Copper is held in carload lots at 12⅛c., while jobbing lots are offered at 12½c. and 12¾c. Pig Lead has remained firm, with a good demand

at 4.05c. for Desilverized in 50-ton lots and 4.07½c. in carload lots. Sheet Zinc is firm at 6½c. in carload lots and 6.65c. in lots of 600 lbs. Old Metals have been dull and unchanged, all kinds. Prices are as follows: Heavy Cut Copper, 11¼c.; Red Brass, 11¼c.; Copper Bottoms, 10c.; Lead Pipe, 3.80c.; Zinc, 3½c.

Coke.—The market has remained firm, with light offerings and an urgent demand. Connellsville 72-hour Coke is nominally quoted at $5.75 to $6. Virginia and West Virginia is wanted at $5.75 to $6, on track, Chicago.

Philadelphia.

FORREST BUILDING, July 15, 1902.

The Iron trade is still surrounded with clouds and darkness, so that it is impossible to see very far ahead. The surprising thing is that with a production of 352,590 gross tons weekly and imports of foreign iron of more than 8000 tons weekly Pig Iron for spot delivery is hardly obtainable at any price. Moreover, the imports of other material amount to 10,000 tons per week, so that we have a supply from one source or another of 370,000 tons per week. Yet there is a scarcity of Coal, of Coke, of cars and of labor, besides other drawbacks, against a normal production. Where does all the stuff come from and where does it go? And how is it under such conditions that the scarcity is so unprecedented? Surely we may say, as the Great Teacher said, "We cannot tell whence it came or whither it listeth;" but we can see the effects, although they are hard to explain. Compared with the close of last month there is very little change in the general conditions. Pig Iron is as scarce as ever, but the disposition to buy for the long deliveries is probably somewhat modified. Prices are high, and to engage Iron 6 to 12 months ahead at $22 and upward appears to be a pretty bold operation. Some have done it to cover contracts for the finished product, others have covered for a portion of their requirements, while still others are watching the course of events and are a little undecided what to do. Makers are perfectly indifferent and are not seeking business at all. When customers ask for quotations for 1903 deliveries they usually name from $22 to $22.50 as inside figures for No. 2 X Foundry; some ask a little more, some are not inclined to commit themselves to anything except "price at time of delivery." It is generally assumed that for long dates prices are high enough, but for the next two or three months there is no knowing what may happen in case the Coal strike continues. In the more advanced products there is a distinctly easier feeling, and while this may be only temporary, it is attracting attention and is regarded as somewhat significant. Still, anything like pronounced dullness is considered out of the question; the real point of issue is, will there be another upward movement when business starts up again? This is the period known as between seasons and it is not clear how soon things may start up or to what extent new business may be expected; hence the desire to wait developments in regard to crops and other matters which will go far to determine the character of business for some months to come.

Pig Iron.—It should not be expected that very exact quotations can be given under such conditions as are now ruling. Every buyer and every seller has his own ideas in regard to the situation and in regard to his own circumstances, and as these are more varied than they have ever been before, it naturally follows that one man's price has little or no influence on what another man's price should be. Taking the market as a whole, however, there is a faint indication that buyers are less anxious. In any case they are not bidding quite as high figures, although Iron for quick shipment is scarcer than ever, and, unless it is for something they must have at once, they abstain from buying, except in a small way and at something less than the extreme figures. It may be the midsummer holiday that is the cause of the lethargy, or it may be the influx of foreign material; but whatever the cause the fact remains that buyers are not disposed to load up at the extreme figures recently quoted until they see that such a course is likely to be a necessity. To-day's prices for 1903 deliveries appear to be about as follows, and for this year 50c. to $1 more, according to circumstances:

No. 1 X Foundry		$23.50 to $24.50
No 2 X Foundry		22.00 to 22.50
No. 2 Plain		21.50 to 22.00
Standard Gray Forge		20.50 to 21.00
Basic		20.50 to 21.00
Low Phosphorus	Prompt shipments or spot.	23.00 to 23.50
No. 3 Middlesboro		21.00 to 22.00
Scotch Irons		22.50 to 23.50

Billets.—The demand is not important, although prompt Steel is wanted in small and medium sized lots. The feeling is easier for long deliveries, but buyers have had to pay $33.50 to $34.50 for August shipment of Basic Open Hearth. Bessemer not being available for that delivery. Nominal prices are about $32.50 for ordinary Bessemer and $29.50 to $30 for foreign, but price depends a good deal on dates for delivery.

Plates.—There is a heavy demand for Plates and a good many orders have been turned down because of the inability to make as prompt deliveries as were required. Mills are full of business and prices firm at the full figures quoted before the holidays: Small lots, 2.10c. to 2.15c. Carload lots and upward: ¼-inch and thicker, 2c. to 2.05c.; Universals, 2c. to 2.05c; Flange, 2.10c. to 2.20c.; Fire Box, 2.25c. to 2.30c.; Marine, 2.30c. to 2.35c.; Charcoal Plates, C. H. No. 1, 2½c.; C. H. No. 1 Flange, 3c.; C. H. No. 1 Flange Fire Box, 3½c.

Structural Material.—There is less difficulty in obtaining small lots from store, as a considerable amount of foreign material has been brought in. Mill specifications, however, are as scarce as ever and actual selling prices are about as follows: 2.35c. to 2.75c. for foreign from store or on dock for Beams, Angles or Tees; mill shipments, 2.75c. to 3c., f.o.b. sellers' mills, for reasonably prompt delivery.

Bars.—There are no special features as regards Bar Iron, but Steel is as scarce as ever and prompt deliveries hard to get, unless at a big premium on the official quotations. Refined Bar Iron, however, is readily obtainable at last month's prices, which is somewhat remarkable considering that several leading mills, owing to labor troubles, have done little or nothing during the past month or six weeks. Soft Steel Bars are held at 2c. to 2.15c; Refined Iron at 1.95c. to 2c. for city or nearby deliveries.

Sheets.—The market is dull, but as there has been a stoppage of the mills for repairs stocks are pretty well reduced. The demand is a little disappointing, however, and prices somewhat irregular, with Best Sheets quoted about as follows (Common Sheets one to two-tenths less): Nos. 10 and 12, 2.30c. to 2.40c.; No. 14, 2.50c.; Nos. 16 and 17, 2.80c.; Nos. 18-21, 3.10c.; Nos. 26, 27, 3.30c.; No. 28, 3.50c.

Old Material.—The market is irregular, and on the whole somewhat easier. There is a good deal of foreign Scrap coming in, and as some of the leading mills are under an embargo, it is difficult to find a market for the somewhat liberal offerings. Prices, however, are fairly steady, with bids and offers about as follows for deliveries in buyers' yards:

Old Steel Rails	$21.00 to $21.50
Heavy Steel Scrap	21.00 to 21.50
Low Phosphorus Scrap	27.50 to 29.00
Old Steel Axles	27.50 to 28.50
Old Iron Rails	24.50 to 25.50
Old Iron Axles	29.00 to 30.00
Old Car Wheels	20.50 to 21.50
Choice Scrap, R. R. No. 1 Wrought	23.00 to 24.00
Country Scrap	18.75 to 19.75
Machinery Cast	17.75 to 18.75
No. 2 Light Scrap (Forge)	18.00 to 19.00
No. 2 Light Scrap (Ordinary)	15.50 to 16.50
Wrought Turnings	16.50 to 17.50
Wrought Turnings, Choice Heavy	18.50 to 19.00
Cast Borings	10.50 to 11.00

St. Louis.

CHEMICAL BUILDING, July 16, 1902.—(*By Telegraph.*)

Pig Iron.—The same quiet conditions are apparent in the Pig Iron market and the volume of new business being executed at this point is of a very light order. One sale of about 1000 tons of Southern Foundry Iron for the last half is the only order of any moment that comes to our notice this week. Furnaces are as yet reluctant to name the figure for 1903 delivery. The following is the range of prices current for cash, f.o.b. St. Louis:

Southern, No. 1 Foundry	$21.50	to 23.50
Southern, No. 2 Foundry	20.75	to 22.75
Southern, No. 3 Foundry	20.25	to 22.25
Southern, No. 4 Foundry	19.75	to 21.75
No. 1 Soft	21.25	to 23.25
No. 2 Soft	20.75	to 22.75
Gray Forge	19.75	to 21.75
Southern Car Wheel Iron	....	to ....
Malleable Bessemer	....	to ....
Ohio Silvery, 8 per cent. Silicon	....	to ....
Ohio Strong Softener, No. 1	....	to ....
Ohio Strong Softener, No. 2	....	to ....

Bars.—The jobbing trade report no change in the conditions ruling in the demand for Iron and Steel Bars, but generally satisfactory and hopeful views for the future are to be noted. We quote from the mills: Iron Bars at 1.90c.; Steel Bars at 1.90c. to 2c. Jobbers quote Iron Bars at 2.25c.; Steel Bars at 2.25c., full extras.

Rails and Track Supplies.—No new features have entered into the situation in the market for Rails and Track Supplies, and the reports from the mills of all the orders they can handle are along the same lines of recently published conditions. We quote Splice Bars at 2.10c. to 2.15c.; Bolts, Square Nuts, 3c. to 3.10c.; with Hexagon Nuts, 3.25c. to 3.30c.; Spikes, 2.50c. to 2.60c.

Angles and Channels.—The jobbing trade are having a very good demand for Small Angles and Channels, and conditions in this department are generally referred to in a most cheerful way. For materials of this class 2.50c., base, is the quotation.

Sheets.—For Sheets of all grades and sizes a very satisfactory demand exists, and in prices firmness is the rule.

Pig Lead.—No new features are apparent and the quiet and dull condition of affairs continues. No change is to be

noted in quotations and Chemical still stands at 3.97½c. and Desilverized at 4c.

Spelter.—Heavy transactions in the Spelter market continue and prices have advanced considerably since our last report. The bid at this time is now said to be 5c. and 5.05c.

Birmingham.

BIRMINGHAM, ALA., July 14, 1902.

The settlement of the miners' wage scale for the ensuing year was the subject of interest the past week, for on that the market hung. Its final conclusion invoked a great sigh of relief, and both sides are gratified that a final agreement was arrived at, though it does not contain all that either side contended for. Mutual concessions were made. There was no change made in the miners' wage scale, and 55c. continues as the maximum price for mining coal. But there was an increase granted to all other labor employed at the mines based on the miners' maximum of 55c. per ton for mining coal and sliding up and down with that as a basis. The miners' vote was not unanimous. It stood 130 to confirm the scale recommended, and 63 to reject it. The final action was accepted in good faith, and in a cheerful spirit by the losing side. They were glad that a settlement was made that permitted resumption of operations.

In a few instances work was resumed on Saturday. Today resumption will be general. But it will be some time before a normal condition of affairs is attained. Taking a retrospective view, we find, first, that stock house supplies are at a very low ebb, and that only in time can this condition be improved. There is no prospect whatever for a while of a maximum output. This will affect deliveries on old business and delays must be expected. They cannot be avoided. This will necessitate the turning down of more or less of new business which is emphasized by the fact that we now have in the district 12 furnaces banked to which there may be additions pending the assembling of material. This means a material default in deliveries on old business. It can't be otherwise. Then one must consider that since the 1st inst. the Coke ovens have been in a state of "innocuous desuetude." They are cold, and it will take all of this week to get them into good producing capacity. Then it will take another week to get enough ahead to start under conditions at all favorable. This statement of the existing condition of affairs will surely show to the Iron fraternity that this district will stand a poor show to relieve even the most pressing necessities of melters of Iron. The suspension of operations has cost this district in output a loss anywhere from 30,000 to 40,000 tons. And it comes at a time when it hurts and hurts badly, for this loss must be made up. The burden must be borne for a while. There is no prospect of its being lifted in the very near future.

As to the market, "the least said the sooner mended." Your correspondent ran up on one sale of 300 tons of Charcoal Iron at $26 per ton at the furnace, part of it prompt shipment, and the balance strung out in deliveries to October. That reported sale of 4000 tons of Gray Forge and No. 4 Foundry Iron on the basis of $17, the writer has tried hard, and without success, to locate. A sale was made the past week, not by the furnace direct and not through the usual channels, of a small lot of No. 1 Soft at $22.50, and there was still another sale of a mixed lot of No. 2 Foundry and No. 2 Soft at $21.50. This illustrates the keen necessities of some buyers who are compelled to have Iron if obtainable, regardless of price demanded. Both lots were for prompt shipment.

The leading interest here will probably open their sales page for 1903 delivery this week, but on what basis has not yet been divulged. Heretofore they have declined to make such sales.

The Oxmoor Furnace Company, capitalized at $100,000, were duly incorporated the past week, which indicated that the terms of purchase of the property from the Tennessee Coal, Iron & Railroad Company had been agreed upon. The sale was admitted later in the week, but has to be confirmed by the Executive Committee in New York before it is complete. That is merely on act of formality, and the sale can be considered as a *fait accompli*. There are two furnaces there, one being partly dismantled, and the other needs relining before going into commission. Included in the sale is a tract of land, of, say, 84 acres. Then there are 468 Coke ovens which are leased to the purchasers for a period of years. There are nine composing the purchasing party, and among them are T. T. Hillman, formerly president of the Tennessee Company; W. S. McCormack, formerly general manager; James Bowron, formerly treasurer, and Erskine Ramsey, formerly chief engineer. T. T. Hillman will be president of the new company. Operations to put the plant in commission will commence as soon as title is made. The sale is in line with the policy of concentration marked out by the Tennessee Company. The price paid is yet withheld. That ample supply of necessary material is available and convenient to hand need not be doubted.

Both rolling mills which have been shut down since the 1st inst. start up again this week, reinforced in labor by accessions from Western points.

The strike of the machinists is still on. The employers declare they will not concede an iota to the demands made, and are gradually supplying the places of the strikers by bringing in men from other districts. So far they are working in unison and standing together.

D. M. Forker, the accomplished treasurer of the southern division of the Republic Company, has resigned his position and is waiting the appointment of his successor, to vacate his position. He will enter commercial life in New York City, and will carry with him the good wishes and kindly feelings of all who have experienced his urbanity and enjoyed his geniality.

The decision of the Court in the case of the Seaboard Air Line Railroad lets down the barriers erected by injunctions to prevent admission into Birmingham. J. M. Barr, the general manager of the Seaboard Railroad, states that the first work will be the construction of the link between this city and Coal City (east of us), and that the line from a point on the E. & W. Railroad to Atlanta is now being located. So much has been said in these letters of the great benefit that this district will derive from this road that it is simple tautology to harp further upon that point.

The contracts have been let for the buildings of the shops and great barn of the Electric Railway & Power Company. Together they will cover a square of ground, and the cost will be $150,000. To this add that the corner-stones of the Hillman Hospital and the Medical College were laid Saturday afternoon, and that large additional enterprises are constantly rising above the horizon, and it becomes plain to even a blind man that we are verifying prophecies once considered as wild visions of the future.

Cincinnati.

FIFTH AND MAIN STS., July 16, 1902.—*(By Telegraph.)*

So far as the general Pig Iron market is concerned the week just past has shown but little change one way or another. The fact that conditions at the Southern furnaces have been adverse is emphasized in the large amounts of lower grades of Iron which have been produced. The amount of this surplus grade, while not seriously large, is nevertheless more than there are visible buyers for. There is plenty of Mill Iron offering and but little is being sold. The supply of Foundry Iron from any source for this year's delivery is still practically nothing. The small lots are selling about as they have been for the past few weeks on the basis of $18 to $19, Birmingham, for No. 3 Foundry. A sale of two cars of Southern Silvery to run 10 per cent. Silicon is quoted on the basis of $21, Birmingham. Northern Irons are very scarce, and practically unchanged as to prices. In regard to next year's delivery, it is noted that the same Southern furnaces who have been selling on the basis of $16.50 to $17, Birmingham, for No. 2 Foundry are still booking a large tonnage. These sales are largely for points on the lakes, and but a comparatively small proportion is going to buyers in this immediate vicinity. All next year's sales are being made subject to change in freight rates. Freight rate from Hanging Rock district is $1.10 and from Birmingham $2.75. We quote, f.o.b. Cincinnati, for 1902 delivery as follows, this year's delivery:

Southern Coke, No. 1	$21.25 to $22.25
Southern Coke, No. 2	20.75 to 21.75
Southern Coke, No. 3	20.25 to 21.25
Southern Coke, No. 4	19.75 to 20.75
Southern Coke, No. 1 Soft	21.25 to 22.25
Southern Coke, No. 2 Soft	20.75 to 21.75
Southern Coke, Gray Forge	19.75 to 20.75
Southern Coke, Mottled	19.75 to 20.75
Ohio Silvery, No. 1	24.60 to 25.10
Ohio Silvery, No. 2	24.10 to 24.60
Lake Superior Coke, No. 1	25.10 to 25.60
Lake Superior Coke, No. 2	24.60 to 25.10
Lake Superior Coke, No. 3	24.10 to 24.60
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel, chilling grades	$27.00 to $27.50
Standard Southern Car Wheel, No. 2	26.50 to 27.00
Lake Superior Car Wheel and Malleable	25.00 to 26.00

Quotations for first six months of 1903, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$19.75 to $20.25
Southern Coke, No. 2	19.25 to 19.75
Southern Coke, No. 3	18.75 to 19.25
Southern Coke, No. 4	18.25 to 18.75
Southern Coke, Gray Forge	18.25 to 18.75
Southern Coke, Mottled	18.25 to 18.75
Southern Coke, No. 1 Soft	19.75 to 20.25
Southern Coke, No. 2 Soft	19.25 to 19.75

Plates and Bars.—While the market is practically unchanged so far as quotations go it is generally regarded as a shade weak, and especially in retail circles prices are being shaved in one way or another. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.90c. to 2c., with half extras; same, in small lots, 2.20c., with full extras; Steel Bars in carload lots, 1.72c., with half extras; same, in small lots, 2.20c., with full extras; Angles, 2.30c. to 2.50c.; Plates, 3-16 inch and heavier, 2c.

Old Material.—The market is strong and active. We quote dealers' buying prices, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, $20 to $21 per net ton; Cast Machine Scrap, $14 to $15 per gross ton; Iron Rails, $24 to

$24.50 per gross ton; Steel Rails, long lengths, $24 to $24.50, gross ton; Steel Rails, short lengths, $18 to $18.50, gross ton; Iron Axles, $26 to $26.50 per net ton; same, extra large, $27 to $28, net ton; Car Wheels, $20 to $20.50, gross ton.

Cleveland.

CLEVELAND, OHIO, July 15, 1902.

Iron Ore.—The movement of Iron Ore from the head of the lake ports to the Lake Erie docks continues very heavy, but the trade is being hindered by several things. In the first place the boats are badly congested at the lower lake docks, so badly so in fact that it is often five and six days before a boat is unloaded. Second, the boats are being detained at the head of the lakes in getting their Ore loaded. This is brought about by a scarcity of cars. This scarcity, which did not appear until a short time ago, has been so great that few of the mines are able to ship their full output to the lake ports. The sales of Ore are light, but there is a promise of some activity along this line later on, as it is now evident that many of the purchasers in the spring did not cover their needs for the year as usual, buying only for the first half of it. This second buying is expected to give the shippers occasion for bringing a larger quantity down the lakes than ever before. On all sales the price does not change from $4.25 for Bessemer, old range; $3.25 for non-Bessemer, old range, and Bessemer Mesaba, and $2.75 for non-Bessemer Mesaba.

Pig Iron.—At present no furnaces in the Mahoning or the Shenango Valley are banked because of the lack of Coke, although one or two of them were out last week, but it is quite evident that not a few of them are running in a hand to mouth fashion with a constant dread of suspension because of the shortening of the Coke supply. There are evidences, however, of a bettering of the conditions in that respect soon. The lessened production of Pig Iron has had the expected effect upon the market, and about all material for quick shipment has been withdrawn. Occasionally there is a carload of Foundry for immediate delivery, but these occasions are rare and the Iron is very valuable. The consumers, however, having urgent need for the material, are paying the premiums without many complaints. As far as the remainder of this year is concerned, the furnaces announce that they have no supply upon which it would be safe to depend, and those consumers who are in need are advised to import. On Foundry grades prices for immediate delivery are variable, but they range about $22 to $22.50 for No. 2, although some sales have been made at higher prices. Most of the interest is in delivery after the first of the year, and on this the price holds up well, $21, Valley furnace, being quoted for No. 2. On Southern Foundry the quotation for the same period is $17, Birmingham, and the furnaces are not anxious to cover at that, most of them being of the opinion that the market would be safer on a lower list of prices. Some of the more pessimistic are even predicting a repetition of the slump of 1900 unless a radical change is soon made in the price policy of the companies producing Foundry Irons. In the Bessemer and Basic trades it is believed the situation is a little better in hand, although there is nothing to boast of even there. The policy of the Bessemer Association past the first quarter of next year is still an unknown quantity. The attitude of these furnaces will hardly be known until some sales have been made, and while they are still in the air nothing has been done. There is nothing available for immediate delivery and hence no sales are made, which makes a quotation of the market impossible. In the Basic trade the utmost quiet prevails. The furnaces are doing nothing in the way of sales, having no surplus.

Finished Material.—Contrary to the pessimistic utterances of some, the state of the Steel trade here gives no evidences as yet of any organic disarrangement that is likely to bring about a slump. In fact, quite the contrary is true as regards the heavier materials and the advanced buying is almost incessant. Two of the trades will indicate this. To-day the announcement is made by all of the big Steel Plate mills that they have sold up their entire output for the first quarter of next year, and even favored buyers have been refused some large lots of material before April 1. The supply for immediate shipment is also very much short of the need, as is indicated here by some of the quotations. The association price is holding at 1.60c. nominally, Pittsburgh base; but one of the Pittsburgh mills has been quoting 2c. at the mill, and has been getting it on quite a bit of business. A Cleveland mill has been selling its output at 2.10c., which is the Pittsburgh price with the freight added. It has had very little difficulty in finding all the orders it could take care of. Structural Steel has likewise been in very large demand. This week one concern here bought 6000 tons. Another took 5000 tons of ship material, Plates and Shapes combined, and another took 1000 tons of straight Shapes. With business of this sort going on there is not much room for pessimism on the Cleveland market. And in addition to the new orders there has been a constant application on old orders, until the specifications have in many instances outrun the original intention of the contract. It is very difficult to find material for quick shipment and most of the consumers have given over trying. Of late, however, some small lots have come upon the market seeking a buyer, and these have been sold at premiums as high as $21 a ton. One lot of 600 tons was sold at that price during the last week. The consumers of agricultural shapes and of harvesting material have been quite active during the week in covering their needs. They have bought in large lots and have in addition inquiries in for a large amount of material. For immediate shipment they present some of the brightest promises of the immediate trade. There is still a notable weakness in the Sheet Steel trade and some of the so-called independent mills have been cutting under the general market quotation to find orders, which, without the cut prices, have been coming rather slowly. Some have taken this as a serious indication of the state of the health of the general trade, but the Steel men in general have no grave fears. The cutting of the smaller mills has not affected the general market so far, and the quotations are holding up at 2.50c. for No. 10 as a basis on the gauges between 10 and 16 and 3.50c. to 3.60c. for No. 27 as a basis for the gauges between 17 and 28. It is confessed, however, that the sales have not been as heavy at these prices as some of the mills might wish. The fact that a good many of the Wire Rod, Sheet and Bar mills have been closed down for repairs was expected to relieve the Billet situation greatly, and some of those who were short on Billets and Slabs expected to lay in a liberal supply, but the relief did not come. It seems to be expected that the mills making the Billets will collect a surplus, which is hardly probable with the material ranging around $34 a ton, as it does to-day. The demand for Rails has been increasingly large and the buying for 1903 delivery seems to keep up quite as well as it has heretofore, offering, therefore, no ground for any belief that the market is easing in that respect. In fact, the inquiry, especially for electric lines, seems to be heavier than the mills have been counting upon. The supply of the smaller sizes of Bars seems to have eased up some and many of the mills are now offering deliveries within four or five weeks. On larger rounds, however, the supply is very well taken up and there is no relief in sight. The mills producing Bar Iron have not resumed operation yet, and while the market is strong it does not show any serious effects of the discontinuance of activity. The fact is that the burden of the trade has fallen to the Steel Bar mills, leaving the Bar Iron an undesirable commodity on the market.

Old Material.—There has been a steady demand for all grades of Scrap, with Cast probably the leader on the market. The prices remain unchanged at the following quotations: No. 1 Wrought, $19.50 net; Iron Rails, $27.50 gross; Iron Axles, $26 net; Cast Borings, $10 gross; Wrought Turnings, $15.25 gross; Cast Scrap, $16 gross; Car Wheels, $19 gross; Heavy Melting Steel, $19 gross; Old Steel Rails, $20 gross.

Pittsburgh.

(*By Telegraph.*)

PARK BUILDING, July 16, 1902.

Pig Iron.—A movement is on foot to consolidate the independent blast furnaces in the Mahoning and Shenango valleys, and it is stated that a determined effort will be made this time to put the consolidation through. It has been tried several times before, but always failed. It was taken up again recently by some New York parties, who say they have secured options on a number of the best stacks in the two valleys, and are now at work on the others. As to how this consolidation, if put through, will affect the proposed new Bessemer Steel plant at Youngstown is not known now, but it may be stated that the projectors of this proposed Steel plant are hard at work, and it looks as though it will be built. Options have been secured on the necessary land, and Julian Kennedy, the consulting engineer, is drawing plans for the new works. It will be known in a very short time whether the plant will be built. The Pig Iron market is exceedingly strong, and many of the furnaces are so short of Coke that they are not turning out more than half of their regular output. Not enough Coke is being made, and cars are very short. Several furnaces are down, and others may have to stop any day. Bessemer Iron is very firm at $21 to $21.25, at furnaces, and it has sold for shipment over last five months of the year at $21, at furnace. The furnaces in the Bessemer Association are practically sold up into first quarter of next year, and have also sold some Iron into second quarter, and are not disposed now to sell more Iron for the second quarter, unless the third quarter Iron is coupled with it. The association has not sold the Steel Corporation any Iron for delivery beyond next April, and have no inquiry from the corporation for Iron at the present time. Gray Forge is very firm at $21, and No. 2 Foundry is $22 to $22.50, Pittsburgh, depending on tonnage and deliveries wanted. We note sales of about 10,000 tons of Basic Iron at $21, at Valley furnace, for shipment over first six months of next year. Also sales of about 20,000 of Soft Malleable Bessemer Iron for extended delivery at prices ranging from $20 to $20.25, at furnaces. Also 3000 tons of Besse-

mer Iron at $21, at Valley furnaces, for shipment over balance of this year, commencing August.

Steel.—The Steel market is somewhat quiet and the tone of the market is easy. A good deal of Steel is being offered, but it is mostly foreign. Domestic Steel is scarce and is $32 to $33 for small lots for prompt shipment. Foreign Steel is being offered at about $32, but it could be bought at a lower figure. A good deal of Steel is being offered for resale, and this is helping to weaken the market.

(By Mail.)

A great scarcity of Coke exists and some of the Valley furnaces are on the ragged edge and may have to shut down unless the situation improves. Many of the furnaces have not more than a day or two's supply of Coke and the railroads seem utterly unable to furnish either enough cars or motive power. It is a repetition of the situation last spring, when some of the furnaces were down for weeks waiting for a supply of Coke. This is having the effect of making Pig Iron scarcer than ever, and some of the mills are again short of Metal. There is not much change to note in the situation in the Iron trade. The market is reasonably firm and on some lines, such as Plates and Structural Material, deliveries are hard to get, and prices are very strong, with premiums being paid for prompt deliveries. Sheets, Tin Plate, Wire and Wire Nails are quiet and the tone of the market on these products is weak. The Shafting makers advanced prices at their meeting last week to 47 per cent. off for carloads, and 42 off for less than carloads.

Rails.—Some figuring is being done by some of the Southern and New England roads, and it is likely additional contracts for Rails will be placed before long. We quote at $28 at mill. A good deal of foreign tonnage in Rails is being offered in this country at comparatively low prices.

Muck Bar.—The market is fairly active and best grades of Muck Bar are held at $36.25 to $36.50, Pittsburgh. We note a sale of 2000 tons at about $36.25 at maker's mill.

Rods.—The South Side Works of the American Steel & Wire Company have been closed for repairs and improvements, taking a large tonnage of Rods out of the market. Demand for Rods is quiet, but the market is very firm and we quote Bessemer Rods at $36 to $36.50, Pittsburgh.

Plates.—A large tonnage of Plates has recently been placed by some of the ship building interests, deliveries in some cases running well into next year. Some of the larger Plate mills have their entire product well under contract for the first quarter of next year, and will not quote in any case for shipment this year. The Plate trade is in splendid shape, and any of the mills that can ship out within two or three months can get from 1.75c. to 1.85c. and higher. Official prices are as follows: Tank Plate, ¼ inch thick and up to 100 inches in width, 1.60c. at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

Bars.—Some irregularity in prices of Iron Bars in the West is reported, but the local market is very strong. A fair amount of tonnage is being placed in Iron and Steel Bars, and specifications on old contracts are coming in fast enough to keep the mills full of work. We quote Steel Bars at 1.60c., half extras, for carload and larger lots, while small lots bring 1.70c. to 1.75c. All specifications for less than 2000 lbs. of a size are subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra, regardless of length.

Structural Material.—The amount of work coming up is very heavy and it looks as though Material may be as scarce in 1903 as it was this year. A good deal of tonnage has already been placed for next year and several mills that had declined to book for next year have had such pressure brought on them that they have opened their books, and taken quite a few contracts. Beam and Channels for delivery bring about whatever price sellers care to quote, from 2c. to 3c. a lb., and even higher in some cases. Official prices are as follows: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inches, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Sheets.—The Sheet market continues quiet, especially Galvanized, and the tone of the market is weak. For the heavier gauges demand is good and the mills are behind on shipments. A good many Sheet mills are closed and output has been cut down very much. This may have the effect of putting the market in better shape before long. We quote No. 27 Black Sheets, box annealed, one pass through cold rolls, at 2.90c. and No. 28 at 3c. in carload lots. For small lots from store the usual advances are charged. Galvanized Sheets are about 75 off in carloads and 70 and 10 to 70 and 5 for small lots. These prices are f.o.b. mill.

Hoops and Bands.—It is said that some large contracts have recently been placed and that some of the mills that were short of orders are pretty comfortably filled again. We quote Hoops at 1.90c. for 250-ton lots and over and 2c. in carloads. Bands are 1.60c. for Bessmer stock, 12-gauge and heavier, while for Open Hearth stock $2 per ton advance is charged.

Ferromanganese.—Practically nothing doing, as large consumers are covered for months ahead. We quote German Ferro at $52 and English at $53, in carloads, Pittsburgh.

Merchant Steel.—At their meeting at Lake George last week the Shafting makers advanced prices to 47 off for carloads and 42 off for less than carloads, delivered in basing territory. Demand is reported heavy and the mills are full of work. The market on Merchant Steel is fairly active and prices are firm, with the exception of Crucible Tool Steel, on which prices are more or less shaded. We quote Tire Steel at 2.25c. to 2.30c.; Sleigh Shoe, 2.25c. to 2.30c.; Open Hearth Spring, 2.50c. to 2.60c., and Toe Calk, 2.35c. to 2.45c. All these prices are for carloads and are f.o.b. at mill. Crucible Tool Steel is quoted at 6½c. to 8c. and 9c. for ordinary grades, at mill.

Skelp.—There is not much demand and prices are not as firm as they were. Steel Skelp is scarce, as some of the mills that roll it still report they are short of Steel. We quote Grooved Iron Skelp at 2.15c. and Sheared at 2.20c. to 2.25c., at mill.

Merchant Pipe.—The Pipe mills are full of work and there is great difficulty in getting deliveries of certain sizes. Tonnage is heavy for this season of the year and prices are very firm. We are told that a few of the smaller mills are quoting slightly higher prices where the buyer wants prompt delivery. Discounts for carload lots are as follows:

Merchant Pipe.	Black.	Galvd.
⅛ to ½ inch, inclusive	60	48
¾ to 12 inch, inclusive	67	55

Boiler Tubes.—There is a heavy volume of business and the market is very firm. Mills that have to pay market prices for Skelp and put it into Tubes have to figure very closely to get a profit. Discounts in carload lots are as follows:

Boiler Tubes.	Up to 22 feet. Per cent.
Steel.	
1 to 1½ inch, inclusive	45
2¾ inch to 5 inch, inclusive	62½
1¾ inch to 2½ inch, and 6 inch to 13 inch, inclusive	52½
Iron.	
1 to 1½ inch, inclusive	42½
2¾ inch to 5 inch, inclusive	50
1¾ inch to 2½ inch, and 6 inch to 13 inch, inclusive	40

Scrap.—The market is quiet and prices are somewhat easier. Some of the mills that use large quantities have been closed, but are getting started again, so that demand will likely soon improve. We quote Heavy Melting Stock at $22.50 in gross tons; No. 1 Railroad Wrought Scrap, $22, net tons; Cast Scrap, $19 to $19.50, net tons; Car Wheels, $21, gross tons; Wrought Turnings, $14, net tons; Cast Iron Borings, $11.50 to $11.75 in gross tons; Old Iron Rails, $27 in gross tons.

Coke.—Another shortage of cars is making Coke exceedingly scarce and offers of as high as $3 to $3.50 for Furnace Coke are being made every day by Eastern furnaces, and in many cases without getting the Coke. Output in Connellsville region last week, according to the *Courier*, was 234,660 tons, a decrease over the previous week.

The German Iron Market.

ESSEN, June 29, 1902.

The large Steel works who possess their own blast furnaces and collieries, and can therefore execute without loss the low priced export orders have been very well employd. The result thereof has been that Pig Iron production in Germany has slightly increased, having been 34,000 tons greater in May, 1902, than it was in the corresponding month of 1901.

The Ore market is quiet, the foreign orders being contracted for a considerable period in advance, while the new quarterly sales of Minette are being made at somewhat lower prices. A number of contracts have been placed for Pig Iron for the third quarter and prices are, on the whole, unchanged. Spiegeleisen, 10 to 12 per cent., manganese is quoted 71 to 72 marks; Special Mill Iron, 60 marks., f.o.b. Siegen; Thomas Bessemer Pig, 57.50 to 58 marks, f.o.b. consuming works; Luxemburg Mill Iron, 46 marks; Foundry Iron No. 3, 49 to 50 marks, f.o.b. Luxemburg; German Foundry Iron No. 3, 61 marks, and Hematite, 66 marks, f.o.b. furnace.

Exports of Pig Iron, which were 290,933 tons during the first five months of 1900 and which were 132,307 tons during the corresponding period of 1901, have declined this year to 58,457 tons, while the export has increased to 115,-

958 tons, as compared with 43,391 tons during the first five months of 1901. The increase in the export of Blooms, Billets, &c., has been phenomenal. During the first five months of this year it footed up to 213,498 tons, as compared with 37,098 tons in 1901, and 3683 tons in 1900.

The Wire Rod mills have already purchased large quantities of Billets for the next quarter, but other consumers are generally holding back. The employment of the Steel works is very good, and consumers are forced to crowd deliveries. We quote Basic Bessemer Ingots, 82.50 marks; Blooms, 87 marks; Billets, 95 marks; Slabs, 97½ marks, with 5 marks premium on Open Hearth quality.

The Beam business is good, the works being very well employed, while stocks are considerably reduced. Work is steadily coming in for export, America recently taking considerable quantities. Other shapes are not doing as well, and consumers are haggling about prices as the result of the low figures made on bridges and structures. For such Shapes for ordinary specifications 117.50 to 120 marks is demanded. Bar prices have receded somewhat further. Steel Bars are quoted 112.50 to 117.50 marks, but may be obtained from second hands at 110 marks. Iron Bars, the output of which is relatively small, are quoted 125 to 127.50 marks for ordinary grades. For special Bars higher prices are obtained. Hoops and bands are quoted 127.50 to 132.50 marks, according to size of order, but also prices are good for export. The situation is quite unfavorable, both as to Plates and as to Sheets.

The Wire mills are well employed, sales of Wire Rods having been made for export quite recently at fair prices. For the third quarter the home price for ordinary Wire Rods is still 130 to 132.50 marks. There is a good deal of work in Drawn Wire, the American competition being notable, always at low prices. But the Americans cannot always make prompt deliveries, and then are out of the running.

The Rail pool of the German works has been renewed; at the same time prices for the contracts with the State railroads have been lowered to 116 marks for Rails and to 108 marks for Ties. Locomotive works are generally quite well employed, while the car works are not in quite as favorable a position. Machine shops and foundries are hungry for employment, and the resulting fierce competition has brought about unprofitable working. This is a condition of affairs which cannot last without leading to very serious consequences.

New York.

NEW YORK, July 16, 1902.

Pig Iron.—The scarcity of Pig Iron for early delivery has become more acute through the continuance of labor troubles. The Birmingham furnaces, which were banked, are expected to resume at an early date. It is reported, but not officially acknowledged, that a leading Southern interest is now booking orders for 1903 delivery on the basis of $16.50, Birmingham. There are further reports of sales of foreign Iron. It is difficult to quote American Pig Irons for nearby delivery, and the following figures are nominal: Northern Iron, at tidewater, No. 1 X, $23.50 to $25; No. 2 X, $22.75 to $23.50; No. 2 Plain, $22.25 to $22.50. Tennessee and Alabama brands are quoted as follows: No. 1 Foundry, $22.50 to $23.50; No. 2 Foundry, $21.75 to $22.50; No. 3 Foundry, $21.25 to $21.75.

Steel Rails.—Further sales have been made, and we are advised on the best of authority that the Rail mills, exclusive of the Colorado works, have sold for 1903 an aggregate of 850,000 tons. This is somewhat lower than the quantity recently stated in the public prints.

Finished Iron and Steel.—The pressure for Structural Material continues, and Beams and Shapes for prompt delivery are very difficult to obtain. Among the larger interests recently taken are the material for a very large power house at St. Louis, and for a power house at Brunot's Island, near Pittsburgh. We quote at tidewater as follows, but must add that for small lots and for prompt delivery much higher prices are being obtained for Structural Material and for Plates: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 2c. to 2.25c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c.; Sheared Steel Plates are 2c to 2.10c. for Tank, 2.10c. to 2.20c. for Flange, 2.25c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.95c. to 2.05c.

Iron and Industrial Stocks.

The week under review, in sympathy with the general stock market, has been a more active one than it has been in the recent past. The most interesting development of the week has been the answer of the United States Steel Corporation with the affidavits of C. M. Schwab, James Gayley, John Birkinbine, Thomas Lynch, W. Nelson Page, James H. Reed and others. There have been large sales of both the common and the preferred at higher prices, the latter reaching 91 on Tuesday. Colorado Fuel & Iron has recovered and rose to 91½. Cambria held its own, being above 25 during the whole week. The Fuller stocks have been noted for a steadily advancing market, reaching 96½ for the preferred and 53½ for the common on Monday. Car & Foundry stocks have been firm. There is again serious talk of an amalgamation with the Pressed Steel Company. Otis Elevator stock has continued strong.

The Bank of California is offering at 105 and interest $600,000 of 5 per cent. 15-year first mortgage bonds of the Risdon Iron Works of San Francisco, Cal. These bonds are redeemable at the option of the company at 105 after five years, and at 102.50 after ten years. The company, it is stated, have no other indebtedness. Extensions are proposed in the shipbuilding department.

Dividends.—The directors of the United States Cast Iron Pipe & Foundry Company have declared a quarterly dividend of 1 per cent. on the preferred stock, payable September 1.

The directors of the Ruud Mfg. Company of Pittsburgh, manufacturers of the Ruud instantaneous water heater, have declared a semiannual dividend of 4 per cent.

Further Advance in Machine Tool Prices.

(*By Telegraph.*)

NIAGARA FALLS, N. Y., July 15, 1902.—Following the recent action of the prominent lathe and radial drill builders, producers of drill presses, planers and shapers met at the International Hotel here to-day and decided to advance prices from 5 to 10 per cent. Besides the advancing of prices, the meeting to-day was of significance inasmuch as it added strength to the National Machine Tool Builders' Association, which has heretofore been a Western organization, the "Big Six" of Cincinnati serving as a nucleus.

At to-day's meeting J. B. Doan of Cincinnati was chairman, and P. E. Montanus of Springfield, Ohio, acted as secretary. Represented in the meeting were the following firms: Aurora Tool Works, Aurora, Ill; the American Tool Works Company, Cincinnati Planer Company, Cincinnati Machine Tool Company and the Cincinnati Shaper Company of Cincinnati, Ohio; H. G. Barr, the Blaisdell Company, Prentice Brothers Company, J. E. Snyder, Woodward & Powell Company, and the Whitcomb Mfg. Company of Worcester, Mass.; the B. F. Barnes Company Rockford, Ill.; Gould & Eberhardt, Newark, N. J.; Hoefer Mfg. Company, Freeport, Ill.; Ohio Machine Tool Company, Kent, Ohio; Springfield Machine Tool Company, Springfield, Ohio; Sibley & Ware, South Bend, Ind.; Flather Planer Company, Nashua, N. H.; the Wilson Machine Company and the W. P. Davis Machine Company of Rochester, N. Y.

The meeting was characterized by a liberal discussion of all features of trade conditions involved, and it was decided to recommend an advance of 5 to 10 per cent. in prices. P. E. Montanus, who acted as secretary, is also secretary of the National Machine Tool Builders' Association, and the majority of the companies represented to-day joined this association, the objects of which are "to promote the interests of machine tool builders in the direction of good fellowship and the liberal discussion of subjects pertaining to the manufacture and sale of machine tools."

A two-story building of brick and stone is under course of construction by the Elkhart Brass Mfg. Company of Elkhart, Ind., which will have a frontage of 75 feet and 168 feet long and a foundry 42 x 75 feet. Brass, iron and wooden specialties will be manufactured, and the company anticipate the opening of their factory by September 1. The company consist of A. E. Hansen, president and manager; W. H. Anderson, secretary, and F. A. Reed, treasurer.

Joseph Wharton of Philadelphia has purchased 3800 acres of coal land near Graceton, Indiana County, Pa., and has started to build a small town, which he has named Coral. The property originally included 24 coke ovens, to which will be added immediately 126 more, some of which in fact are already at work, and to these 150 ovens another 150 will probably be added. Mr. Wharton says he is building there the best washers that can be contrived.

Metal Market.

NEW YORK, July 16, 1902.

Pig Tin.—As the stock on hand is under close control, manipulators succeeded in advancing prices considerably, and the market is now somewhat firmer than it was a week ago. As for actual business, however, there was no increase noted as could be expected at this time of the year. Purchases for consumption were, in fact, rather light. Closing prices here to-day were as follows: Spot, 28.80c. to 29.25c.; July, 28.70c. to 28.95c.; August, 28.45c. to 28.60c.; September, 28c. to 28.50c.; October, 28¾c. to 29c. Although the operations are being directed in this country, the advanced prices come by way of London. The London market at the close to-day was £128 12s. 6d. for spot and £126 17s. 6d. futures. Arrivals thus far this month were small, amounting to but 872 tons. The afloats for the month amount to 3073 tons.

Copper.—The market is lower and weak. There has been a steady weakening during the last few days. Offerings were very liberal, but buyers hesitated, and consuming demand at present is small. It is said that several mills are still closed for repairs. The monthly production for June in this country is very large, and occasioned considerable comment. As shown in the table printed below it amounted to 26,740 tons. The closing prices to-day were as follows: Lake spot to October, 11.95c. to 12.05c.; Electrolytic spot to July, 11.95c. to 11.97½c.; August to October, 11.95c. to 12c.; Casting spot to October, 11.75c. to 11.87½c.; Standard spot to October, 11.50c. to 11.65c. There was a sale of July Electrolytic on the exchange to-day involving 100,000 tons at 11.95c. The London market did not show much life, and fluctuations were slight, the closing prices being spot, £53 2s. 6d., and futures, £53 7s. 6d. Best Selected was quoted £58.

Pig Lead.—This market is unchanged, with the steady business of ordinary volume. The Smelting & Refining Company still quote 4.12½c. for Desilverized spot, and 4.10c. for 15 days, New York. The London market fell off a shade, closing to-day £11 5s.

Spelter.—The market is still as strong as ever and prices are unchanged. Demand is fairly active and several good inquiries for August and September delivery are reported. Consumers are well supplied for immediate requirement, but have no stock on hand to speak of. Producers also claim to be rather bare of stock, but at the same time it is said in the trade that several good sized offerings for early delivery have been made. We hear of a good sized order having been placed for August delivery at 5c., f.o.b. Pittsburgh. Spot is quoted here 5.12½c. and St. Louis quotes 4.90c. to 5c. Another advance of 5 shillings was made in London, the closing price to-day being £19 5s.

Antimony—Has declined slightly. Hallett's is now quoted at 8.25c., and Cookson's remains unchanged at 10.25c. Other brands are quoted 8c.

Nickel—Is unchanged; ton lots are quoted at 50c.

Quicksilver.—Prices are on a basis of $48 per flask of 76½ lbs. in lots of 50 flasks or more.

Tin Plates.—The market is unchanged. The American Tin Plate Company are quoting for delivery until October 1 on a basis of $4.19 per box of standard 100-lb. Cokes, f.o.b. New York, or $4 f.o.b. Pittsburgh. Quotations from Swansea show a decline of 1½d. to 13s. 3d.

John Stanton reports the Copper production in the United States and of the foreign reporting mines and United States exports as follows, in gross tons of 2240 lbs.:

	Reporting mines.	Outside sources.	Total U.S. product.	Product foreign mines.	U. S. exports.
First half 1895....	70,612	9,100	79,712	42,484	34,215
Second half 1895..	84,885	6,600	91,485	43,674	30,507
Total 1895.....	155,497	15,700	171,197	86,178	64,722
First half 1896....	94,180	7,200	101,380	42,255	58,216
Second Half 1896..	95,314	7,200	102,514	43,941	67,287
Total 1896.....	199,494	14,400	203,894	86,196	125,503
First half 1897....	103,651	5,000	108,651	44,263	64,870
Second half 1897..	100,555	6,900	107,455	44,007	64,340
Total 1897.....	204,206	11,900	216,106	88,270	129,210
First half 1898....	112,687	7,800	120,487	40,880	68,284
Second half 1898..	103,535	10,250	113,785	43,674	76,831
Total 1898.....	216,222	18,050	234,272	84,554	145,115
First half 1899....	111,987	12,500	124,487	43,629	56,460
Second half 1899..	118,518	18,900	137,719	45,611	63,351
Total 1899.....	230,806	31,400	262,206	89,240	119,811
First half 1900....	114,177	20,400	134,577	43,153	90,747
Second half 1900..	113,810	20,400	134,104	46,278	63,335
Total 1900.....	227,987	40,800	268,681	89,431	160,082
First half 1901....	112,794	20,600	133,394	46,847	50,027
Second half 1901..	110,561	21,300	131,861	53,394	44,339
Total 1901.....	223,355	41,900	265,255	100,241	94,366
January, 1902.....	15,155	3,800	18,955	7,367	15,021
February, 1902....	16,931	3,400	20,331	8,475	16,108
March, 1902.....	20,335	3,700	24,035	8,979	20,097
April, 1902.....	20,824	3,800	24,624	10,169	16,424
May, 1902.....	21,763	4,000	25,763	9,354	16,283
June, 1902.....	22,740	4,000	26,740	8,202	14,027
First half 1902....	117,748	22,700	140,448	52,546	97,960

The New York Machinery Market.

NEW YORK, July 16, 1902.

In another column we print a report of the meeting of builders of drill presses, planers and shapers, at which an advance in prices of from 5 to 10 per cent. was decided upon. It will be recalled that a little more than a month ago the prominent builders of lathes and radial drills met in New York and declared an advance amounting to about 10 per cent. With yesterday's action taken into consideration, the prices of practically all machine tools have been advanced considerably, at any rate the strengthening of prices in this branch of the trade is so far reaching that the tone of the entire machine tool market is firmer by far than it has been for many months. It is interesting to note the apparent alacrity with which the builders were gotten together, once the scheme of united action was approached. And this in the machine tool trade, where never before was any thought of concerted action considered seriously. At yesterday's meeting at Niagara Falls, the acquisition to the ranks of the National Machine Tool Builders' Association may prove of greater moment than the advance of prices. When this organization accomplishes what it has set out to do, better conditions will exist in the machine tool family. Perhaps the addition of several Eastern names to the roll of the association will hasten the day. The situation is a most interesting one. Several well known factors in the trade are of the opinion that a more opportune time could have been selected than the present, when business is naturally quiet.

The largest individual machine tool order placed during the week did not take a very great amount of machinery, but was of considerable interest. It was placed by the New York, New Haven & Hartford Railroad, and was for the equipment of the long deferred Newport shops. The list included almost 50 tools, the orders being well scattered about in the trade. This job has been followed closely by the trade for many months.

There was a rumor in the street to the effect that a well-known machinery and supply house were about to build a machine shop, 100 x 500 feet, in New Jersey. The parties involved denied the report.

An interesting announcement comes from Pittsburgh to the effect that the Pressed Steel Car Company have abandoned their shop at Allegheny devoted to the building of machinery required in building parts of steel cars at their various plants. Hereafter, it is stated, the company will purchase all of their machinery in the open market.

J. J. Disosway, president of the Cotton States Belting & Supply Company of Atlanta, Ga., is interested in the American Adding Machine Company, also in Atlanta. The machine which the new company propose placing on the market is named the Centigraph. A committee composed of J. J. Disosway, C. R. Winship and C. G. Lippold are now corresponding with machinery manufacturers with a view of having special machines built for the manufacture of the Centigraph, a new plant being proposed for Atlanta.

We are informed that the Builders' Iron Foundry of Providence, R. I., will erect a new and considerably larger plant at Bristol, R. I. When completed the Providence equipment will be removed to Bristol. The concern are now employing about 400 men. Plans for the new shops and specifications for the new equipment required have not been prepared as yet.

The Otis Elevator Company have been buying machine tools quite freely of late for the equipment of a new plant being erected by this concern in Canada. Thomas E. Brown, chief engineer of the Otis Elevator Company, with offices at 71 Broadway, is arranging to begin construction on a 2000 horse-power power plant to be built at Boise Island by the Highland Valley Power Company. The company were recently incorporated at $100,000.

The Nevada Construction Company of Carson City, Nev., and 20 Broad street, New York City, recently organized, will within the next few weeks let contracts for a large amount of equipment for the power plant, water system and ore reduction mill they are to install at Tonopa. The Tonopa Water & Power Company, also recently organized, will operate a portion of the plant. The Nevada Construction Company advise us that they will first let contracts for digging a ditch 65 miles long, after which they will let the contract for 10 or 12 inch pipe of equal length, either iron, steel or wood, to conduct water from Twin River in Smokey Valley, Nye County to Tonopah. They will then erect a power plant, using impact wheels of the Pelton type and electric generators of about 1000 horse-power, raising the potential to 30,000 volts and transmitting that amount of power into Tonopah. With this water and power at hand they will erect a mill for the reduction of ores with a capacity of 200 tons per day, selling the surplus water and power to the inhabitants of that town. The company will use water meters, and would be pleased to hear from manufacturers.

The Gray & Dudley Hardware Company of Nashville, Tenn., have secured the contract for furnishing the tools, machinery, &c., for the new shops, which are to be built by the Tennessee Central Railroad Company in that city. The

contract was awarded by the Tennessee Construction Company, and will amount to about $75,000.

Joseph H. Wallace of 5 Beekman street, who makes a specialty of designing and constructing large paper mills, has a number of good projects on his boards. The largest work which he has in hand is the construction of the plant of the White Mountain Paper Company at Portsmouth, N. H. The buildings of this plant are now being erected. The engine order has not been placed as yet. He has just completed plans for a new plant to be built at Rutherford, N. J., for the Flintkoat Roofing Company, who are controlled by the J. A. & H. W. Burt Company of 34 India street, Boston. Work has not yet been commenced on the plant. For the J. & J. Rogers Company of Ausable Forks, N. Y., Mr. Wallace has designed a three-machine paper mill to be built at Ausable Forks. The contracts for the paper making machinery have been let. The boiler order was awarded to the Holyoke Steam Boiler Company of Holyoke, Mass. The engines have not been purchased. There will be one 200 horse-power and one 125 horse-power. Another 200 horse-power unit will be purchased later. For the Kalamazoo Paper Company of Kalamazoo, Mich., two 130-inch paper making machines and some other equipment have been purchased. The boilers and engines have not been decided upon. Another new plant which Mr. Wallace has in hand is being built for the Munising Paper Company of Munising, Mich. Besides a three-machine paper mill, a 50-ton sulphite mill will also be erected here. None of the equipment for this plant has been secured as yet.

The Whitlock Coil Pipe Company of Hartford, Conn., have been awarded the contract for the feed water heaters for the Kingsbridge Power Station of the Third Avenue Railroad Company of New York City by Westinghouse, Church, Kerr & Co., the engineers. This is one of the largest single orders for feed water heaters ever placed in the United States, and comprises 25,000 horse-power of the American standard copper coil feed water heaters of the Whitlock Company's latest improved design, which will be furnished in four units, making these heaters probably the largest coil heaters ever constructed.

M. H. Treadwell & Co. of 95-97 Liberty street received an order from the Sharon Steel Company of Sharon, Pa., for five cinder cars. They also received an order for 12 engine housing castings, weighing 20 tons each, from the Allis-Chalmers Company, and 600 tons of iron castings, to be used on the Newtown Creek Bridge.

Several orders have been placed by the Ruggles-Coles Engineering Company of 39-41 Cortlandt street for machinery for the cement plant of the Stewart Iron Company, at Sharon, Pa. Hooven, Owens & Rentschler received on order for a 600 horse-power horizontal Corliss engine. Wheeler boilers were ordered and pumps from the Ohio Pump Company of Canton, Ohio. Ruggles & Coles dryers and West pulverizers will be installed. A. A. Cardwell will install Berryman feed water heaters.

The Philadelphia Pneumatic Tool Company, Philadelphia, Pa., have concluded arrangements for representation in South Africa with headquarters at Johannesburg. This agency will be in charge of Gen. Samuel Pearson, late of the Boer forces. General Pearson has been in the United States for some months in the interests of his Government, in the attempt to have the mule shipments from Port Chalmette stopped. Now that peace has been declared he will return to his former business in machinery lines and will handle the accounts of the Philadelphia Pneumatic Tool Company and others. Before coming to America General Pearson saw much active service in the field, being for a time in charge of railway traffic.

The American Boiler Manufacturers' Association will hold their fourteenth annual convention next week at the Royal Palace Hotel, Atlantic City, N. J. Richard Hammond of Buffalo, N. Y., is president, J. D. Farasey of Cleveland, Ohio, is secretary, Joseph Wangler of St. Louis, Mo., is treasurer, and the four vice-presidents are John O'Brien of St. Louis, R. Munroe, Jr., of Pittsburgh, Samuel Borger of Columbus, Ohio, and J. M. Robinson of Boston.

The Columbus Iron & Steel Company, at Columbus, Ohio, have blown out their Bessemer furnace on account of shortage in supply of coke.

The Sharon Steel Company, at Sharon, Pa., have blown out their blast furnace for relining and other extensive repairs. The furnace had not been working satisfactorily for some time.

The Tin Plate Trade.

Replying to misleading reports circulated during the last week, W. T. Graham, president of the American Tin Plate Company, issued the following statement:

Reports published in this week's daily and trade papers representing that a cut in wages is contemplated by the American Tin Plate Company are absolutely untrue. The American Tin Plate Company have no difference with the Amalgamated Association of Iron and Steel Workers, and mutual feelings of satisfaction and friendliness between the company and all their workmen were never more pronounced than they are at the present time. The time of the recent conference between the company and the Amalgamated Association was entirely given to consideration of a question of mutual interest, and reached an agreement as to the course that would be advantageous to both. This question was one requiring decision by the several lodges of the association, and is now recommended to them for favorable action by the officers and all the members of the Association's Conference Committee.

The Davenport Foundry & Machine Company, Davenport, Iowa, are building an addition to their machine shop. The building will be 87 x 132 feet, all of which will be used as a machine shop, except a small space, 21 x 24 feet, which will be used as additional office room. The entire building will be steam heated, fitted with traveling cranes and a number of new machines in addition to those which will be taken out of the present machine shop. This improvement will give the company considerably more room all around and enable them to increase their capacity. The new machines required have not been fully decided upon.

Negotiations are under way that will result in the removal of the Stewart Iron Works from Cincinnati to Norwood, Ohio. The business, which is the manufacture of architectural and structural iron, is carried on by R. C. and Wallace Stewart, brothers, and has grown to such proportions that the works are too small and their location does not permit of the expansion of the plant. The site selected in Norwood is in the neighborhood of Waverly avenue, near the works of the Cincinnati Tool Company. The Stewart Iron Works are a copartnership, but it has been decided to incorporate the business with a capital of $500,000. This step will be taken as soon as arrangements for the removal of the plant have been perfected. Plans for the building at Norwood have already been drawn and accepted.

A. M. Crane & Co., Incorporated, whose main offices are in the Rookery Building, Chicago, have established an Eastern office in the new Century Building, 74 Broadway, New York, under the management of E. Baerwald, who for a number of years was the London representative of the Illinois Steel Company, and the American Steel & Wire Company. The firm conduct a general business in importing and exporting iron and steel in addition to acting as sales agents for a number of prominent manufacturers of specialties. They enjoy excellent connections abroad, enabling them to handle any foreign business which may be intrusted to them.

Charles R. Roof has relinquished his position as general superintendent of the Youngstown Mfg. Company, Youngstown, Ohio, makers of bolts, nuts, rivets, &c., and is organizing a $200,000 company to establish a large modern bolt and nut works.

George L. Brown, formerly of the Oliver & Snyder Steel Company, at Pittsburgh, but more recently of the New York Ship Building Company, has resigned his position with the latter concern and has been appointed secretary and assistant treasurer of the Clairton Steel Company, at Pittsburgh. The offices of the Clairton Steel Company have been removed from the works at Clairton to the second floor of the German National Bank Building, Pittsburgh.

The United States Steel Corporation's Answer.

The United States Steel Corporation, on the 15th inst., in the Chancery Court at Newark, N. J., filed their answer to the suit brought against them by J. Aspinwall Hodge, Bernard Smith and William H. Curtiss, who asked for a bill of injunction to restrain the corporation from converting $200,000,000 of their preferred stock into second mortgage bonds, the issuance of $50,000,000 additional second mortgage bonds, and the payment to the syndicate managers of the commissions claimed.

After traversing the bill of complaint and denying a number of its allegations, which are especially material to sustain the application of the complainants, the answer presents a number of affidavits relative to the great value of the properties owned by the corporation. These affidavits are made by President Charles M. Schwab, Chairman Elbert H. Gary, Vice-President James Gayley, John Birkinbine of Philadelphia, President Thomas Lynch of the H. C. Frick Coke Company, President Wm. Nelson Page of the Gauley Mountain Coal Company, President James H. Reed of the Bessemer and Lake Erie Railroad Company, Secretary Richard Trimble of the corporation and others. Some of these affidavits present exceedingly interesting information. Liberal extracts from President Schwab's statement are as follows:

President Schwab's Statement.

The issued and outstanding capital stock of the United States Steel Corporation now amounts to $1,018,583,200 par value, which consists of 5,102,809 shares of 7 per cent. cumulative preferred stock of the par value of $100 each, and 5,083,023 shares of common stock of the par value of $100 each. The outstanding bonded indebtedness of the Steel Corporation amounts to $303,757,000. The mortgage or bonded indebtedness of the subsidiary companies amounts to $60,221,250. The cash and cash assets of the Steel Corporation and subsidiary companies on June 1, 1902, amounted to the sum of $214,278,000, as against which there stood the usual current liabilities and accounts and bills payable and certain mortgages and purchase money obligations, amounting to $65,987,000, leaving the aggregate net cash assets as of that date $148,291,000, and such aggregate net cash assets have increased more than $12,000,000 since June 1, 1902.

The net profits of the United States Steel Corporation and their subsidiary companies during the first year—that is to say, from April 1, 1901, to April 1, 1902—amounted to $98,766,452, after deducting therefrom $12,736,601 to provide for various sinking funds to meet the principal of existing bonded indebtedness at maturity, and to represent depreciation in plants, &c.

The Steel Corporation paid during the first year of their business $15,200,000 for interest upon their bonds; $2,533,333 for their bond sinking funds; $35,682,962 in 7 per cent. dividends upon their preferred stock, and $20,309,641 in 4 per cent. dividends upon their common stock, and after such expenditures (and $25,282 for dividends on sundry subsidiary companies' stock) there remained a surplus of $25,015,233. The net earnings during the first three months of the second year—viz., from April 1, 1902, to July 1, 1902—were $37,691,700, or at the rate of $150,766,000 per year. In my opinion, the net earnings for the second year of the Steel Corporation's business ending April 1, 1903, will greatly exceed those of the first year, and will equal and probably exceed $140,000,000.

The United States Steel Corporation properties earned during the period of 15 months since their incorporation net profits in excess of 10 per cent. upon their entire capital stock, after providing for all interest charges, sinking funds, depreciation, &c. This is equal to 13 per cent. upon the common stock after deducting the 7 per cent. dividend upon the preferred stock. During the second year the properties are earning at the rate of over 14 per cent. upon their common capital stock, after deducting 7 per cent. cumulative dividend upon the preferred stock.

At the time of the incorporation of the United States Steel Corporation I had occasion carefully and exhaustively to consider, estimate and determine the intrinsic values of the various properties represented by the proposed bond and stock capitalization, in order to determine upon the advisability of a sale of the properties of the Carnegie Company and of other properties to the United States Steel Corporation, not only because I was individually interested as a large owner of interests in such properties, but also for the purpose of recommending the securities of the United States Steel Corporation to others similarly situated. Since the organization of the Steel Corporation, in the performance of my duties as president, I have also had occasion to examine and determine to the best of my ability the intrinsic values and earning capacity of said properties. In my opinion the actual intrinsic value of said properties of the United States Steel Corporation exceeds the par value of the bonds and preferred and common stock now outstanding. I am individually the owner and holder of 61,602 shares of the preferred stock and 81,528 shares of the common stock, and I have greatly increased my holdings within the last six months because convinced of the intrinsic and earning value of the preferred and common stock. Indeed, I have sold bonds of the Steel Corporation and purchased common stock in lieu thereof.

The properties owned and represented by the United States Steel Corporation are of enormous value, and many of them are indispensable for the successful conduct of the business and could not be duplicated in the United States or elsewhere at any price.

The following items of value are, in my opinion, substantially below the real values of the properties themselves, and are below the actual value of the properties to the United States Steel Corporation—viz.:

Iron and Bessemer ore properties	$700,000,000
Plants, mills, fixtures, machinery, equipment, tools and real estate	300,000,000
Coal and coke fields (87,589 acres)	100,000,000
Transportation companies, including railroads (1,467 miles), terminals, docks, ships (112), equipment (23,185 cars and 428 locomotives), &c.	80,000,000
Blast furnaces	48,000,000
Natural gas fields	20,000,000
Limestone properties	4,000,000
Cash and cash assets as of June 1, 1902	148,291,000
Total	$1,400,291,000

The foregoing items of valuation do not include any allowance for the value of the good will and established businesses of the various plants and properties, nor do they include anything for the very valuable patents, trade-marks and processes owned or controlled, or anything for the large amount of orders for manufactured goods which have been actually received and are in process of filling. These orders amount in the aggregate to about $150,000,000 and will keep the various producing mills and plants fully occupied until after January 1, 1903, and now assure a net profit of over $60,000,000.

In explanation of these items of valuation I add as follows:

As to the iron and Bessemer ore properties, it is my opinion that the valuation of $700,000,000 represents less than the actual value of the ore which our tests have shown to be practically in sight. It would be impossible for the United States Steel Corporation or any one else to purchase similar and equally advantageous and valuable ore properties in any part of the world. These ore properties are indispensable to the operation of the United States Steel properties, and they yield supplies of ores which, if they had to be purchased, would involve the corporation in an additional cost for their ores according to present value of at least $30,000,000 per annum, an expense which would necessarily increase in the future by reason of the exhaustion of known Bessemer ore deposits. If the United States Steel Corporation did not own control of these ore properties and now had the opportunity of purchasing them, in my opinion they would not only be willing but would

be practically constrained to pay therefor at least $700,000,000.

As to the plants, mills, fixtures, machinery, equipment, tools and real estate, which I have valued at $300,000,000, I state, after years of careful study of the subject and of these properties, that they are worth much more than $300,000,000 in cash to the United States Steel Corporation. These properties include 400 producing mills, as shown in Schedule 1 to this affidavit, and the majority of these mills are situated most advantageously by reason of proximity to the coal and ore fields and manufacturing centers, and it would be practically impossible to duplicate their facilities and their advantageous locations for $300,000,000, if indeed they could be duplicated at any price. They represent the best steel mills in the world, with every advantage for economical manufacture of all grades of steel work.

It is in these producing mills that the United States Steel Corporation's subsidiary companies are enabled to make the profit above specified, which is now equal to the rate of $140,000,000 per annum, and without such producing mills these profits could not be made, although the other properties, such as the ore fields, transportation facilities, &c., would of themselves separately under any conditions earn large profits.

As to the coal and coke properties which I have valued at $100,000,000, I state that, according to present market values of coal and coke, these properties, the greater part of which are not yet fully developed, show a net profit to the United States Steel Corporation from their operation of over $1,000,000 per month, or at the rate of $12,000,000 per annum. These properties comprise 54,269 acres of coking coal and 33,320 acres of steam coal, making a total of 87,589 acres, situated in the best coal regions of the United States and within easy access by economical transportation facilities to the producing mills.

As to the transportation properties, I state that the valuation of $80,000,000 is after deducting the bonded indebtedness of $40,340,000 upon such properties. These transportation facilities could not, in my opinion, be duplicated under any circumstances without an expenditure by the United States Steel Corporation or their subsidiary companies of very much more than $120,000,000. If these transportation facilities were not owned and controlled the value of the producing mills and of the mines would be substantially diminished, because of increased cost of transportation and manufacture, and this would necessarily diminish the profits realized from the operation of the producing mills to the extent of at least $10,000,000 per annum. These transportation facilities include 1467 miles of railroad, 23,185 freight and other cars, 428 locomotives, 112 ships and immensely valuable terminals and docks. These ships represent a displacement tonnage of 344,318 tons.

As to the blast furnaces, which I have valued at $48,000,000, I state that these furnaces could not be duplicated or replaced for any such amount. There are 75 blast furnaces, located in 28 different places, and having an annual capacity of 8,500,000 tons.

The natural gas fields, which are valued at $20,000,000, could not be repurchased or duplicated at any price. In stating the valuation of $20,000,000, I have borne in mind the probabilities of exhaustion and have made allowance therefor. According to the present earning value or profit of such natural gas fields they are worth at least $2,000,000 per annum to the operation of the other properties, and represent a net saving of more than that amount.

As to the limestone properties, which are valued at $4,000,000, I state that such properties could not be duplicated for any such sum, and that if these properties were not owned the Steel Corporation would be obliged to make additional annual expenditures of at least $500,000.

The item of cash and cash assets represents cash actually in bank to the amount of $66,759,000, and working assets, such as accounts and bills receivable, ores, pig iron and other materials in process of manufacture, &c., as shown by the inventories of the companies, to the amount of $147,519,000, making a total of $214,278,000. These cash assets are inventoried at cost, and this sum represents much less than the market value of such assets. If the corporation had to replace them according to the present market value they would cost at least $200,000,000 in cash. As against these cash and working assets of $214,278,000, the current liabilities, which include all accounts and bills payable, mortgages and purchase money obligations, amount to $65,987,000, leaving net cash assets as of June 1, 1902, of $148,291,000, to which should be added the net profits for the month of June, 1902, which are estimated at $12,250,000. The net profits for the month of May were $13,120,930.

The total net earnings of the said properties during the first six months of the year 1902, after deductions each month for ordinary repairs, renewals and maintenance of plants, for interest on bonds and fixed charges of the subsidiary companies and for sinking and reserve funds, were $64,407,153. The additional expenditures for improvements of plants and facilities which are now contemplated and which are to be provided for out of the new $50,000,000 of bonds, will increase the earnings from $10,000,000 to $15,000,000 per annum. The present net earning capacity of the properties, without any increase in the price of the manufactured goods, is, in my opinion, now in excess of $140,000,000.

The present fixed charges of the United States Steel Corporation are 5 per cent. per annum on $303,757,000 of bonds and an annual sinking fund of $3,040,000, making an annual charge of $18,227,850; and if and when the proposed issue of second mortgage bonds is outstanding—namely, $250,000,000 at 5 per cent., together with an annual sinking fund of $1,010,000, the total fixed charges of the United States Steel Corporation for interest and bond sinking funds will be $31,737,850, to provide which the corporation are now earning at the rate of $140,000,000 per annum. In other words, they are now earning in net profits over seven times their said present fixed charges and about four and one-half times their total fixed charges if the new bonds are issued. The profits of the United States Steel Corporation could be reduced more than 75 per cent., and there would still be ample funds to pay the interest and sinking funds upon the first and second mortgage bonds. Instead of a margin of 2 per cent., as intimated in the affidavit of said Smith, there is a margin of 75 per cent. before the solvency or financial ability of the Steel Corporation can possibly be questioned. The most careful investigation was made at the time the Board of Directors voted to recommend the issue of $250,000,000 of second mortgage bonds to determine whether, under any reasonably possible conditions, the earnings of the Steel Corporation and their subsidiary companies would be reduced below the total fixed charge of $31,737,850. The unanimous opinion of the officers and directors who had had a lifetime of experience in this business was that, under no conditions of the iron and steel trade or of business depression, was there any reasonable likelihood that the earning capacity of these vast properties would be reduced to any such extent. Had I and my associates in the management of the United States Steel Corporation and their subsidiary companies and the members of the Board of Directors not concluded that there was no reasonable probability of any such depression in business as to reduce the earning capacity of these properties 75 per cent., the plan of issuing second mortgage bonds would not have been approved or recommended to the stockholders.

There is a sinking fund to provide for the gradual paying off of the first mortgage bonds. This sinking fund now amounts to $3,040,000 per annum, and the operation of this sinking fund will in about 45 years provide for and pay off the whole of the issue of first mortgage bonds and thus reduce the outstanding bond capitalization of the United States Steel Corporation by $304,000,000. If the proposed issue of second mortgage bonds be made, the Steel Corporation, before the expiration of the 60 years, will also have provided for the payment of such second mortgage bonds out of the sinking fund, and they will then have no outstanding bonds and only about $300,000,000 par value of preferred stock

and about $500,000,000 of common stock, as against a present bond and stock capitalization of $1,322,340,200.

How President Lynch Values the Coke Properties.

The affidavit of President Lynch of the H. C. Frick Coke Company is in part as follows:

The coke properties of the subsidiary companies of the United States Steel Corporation, situate in West- (Pocahontas region), consist of 42,000 acres (Connellsville region), and in McDowell County, W. Va., (Pocahontas region), consist of 42,000 acres (Connellsville coal), which are of the present value of $1500 per acre, representing an aggregate value of $63,000,000.

Separated from such Connellsville region is what is known as the "Lower Connellsville District," in which the companies own 15,000 acres, which is of the present value of $800 per acre, or in the aggregate $12,000,000

The companies own in Westmoreland and Fayette counties, Pennsylvania, 16,000 Beehive coke ovens, with the necessary equipment for operating the same, houses of employees, &c., of the aggregate value of 12,500,000

The companies own likewise transportation facilities, cars, water plants, &c., of the present value of 2,500,000

The companies also own a lease of 50,000 acres of Pocahontas coal lands in McDowell County, West Virginia, of the value of 2,500,000

The companies also own steam and gas coal in Allegheny, Washington and Green Counties, Pennsylvania, 22,550 acres at $300 per acre 6,765,000

The companies also own scattered tracts of coal lands at or near mills and furnaces of the subsidiary companies in Ohio, Pennsylvania, Illinois and West Virginia, 6500 acres, of the present value of $100 per acre 650,000

Total itemized valuations $99,915,000

The above valuations are figured on the prices now asked for similar coal lands in the several localities. In fact, the Connellsville properties could not be duplicated at any price, for the reason that there is less than 15,000 acres of unmined coal in the entire Connellsville basin outside of the holdings of the subsidiary companies of the United States Steel Corporation.

The coke properties owned by the said subsidiary companies could not be duplicated or replaced in any locality of the United States at any price, and it is, therefore, impossible to accurately estimate their value to such subsidiary companies.

The average yield in coke per acre of Connellsville coal is 7500 tons, and the present market price of Connellsville coke would show a profit to the producer of at least $1.25 a ton, the present market price. The said subsidiary companies are at the present time producing about 800,000 tons per month which, at the present basis of market price, shows a profit of $1,000,000 a month to the subsidiary companies from this item alone.

Taking the average yield in coke per acre of Connellsville coal to be 7500 tons, the 42,000 acres would alone yield 315,000,000 tons. Putting aside the present profit of $1.25 per ton, and taking the profit to be only 50 cents per ton, this would represent $157,500,000 in value to the United States Steel Corporation.

The value of the coal and coke properties above enumerated to the subsidiary companies and the general business of the United States Steel Corporation is practically incalculable for the reason that in my opinion it would be impossible to replace these properties or to secure an adequate supply of coal and coke at anything like the present cost.

The Pittsburgh Steel Company.—PITTSBURGH, PA., July 16, 1902.—The Pittsburgh Steel Company of Pittsburgh will make a partial start in their new w rks at Monessen, Pa., in about a week. The wire and wire fencing departments will be started first, and the plant is expected to turn out when running full ab ut 250 tons of wire fencing per day. A specialty will be made of this product. The rod mills will not be started for some time, as there has been delay in getting the buildings finished.

The Niles Car & Mfg. Company.

The new plant of the Niles Car & Mfg. Company, at Niles, Ohio, has been completed and was opened for inspection last week. The product of the works will be street cars, and it is the only industry of the kind in the Mahoming Valley. The plant extends over an area of 7½ acres of land. Six acres of this are under cover. There are three large brick buildings built on the most improved plans. The office building, boiler rooms and blacksmith shops are connected with a large building, 202 x 120 feet. The second and third buildings are both 130 x 202 feet. In the first building proper the largest number of men are employed. Downstairs are wood turning machines, where nearly every part to build a street car is produced. On the upper floors are located the cabinet and upholstering shops and the finishing department. The second building is where the cars are put together. In the third building the cars are completed and painted. Between the second and third buildings is a transfer table, propelled by electricity. By this convenience cars are taken from one building to the other or loaded upon railroad cars for shipping.

The Niles Car & Mfg. Company commenced building operations during the early part of March of this year. The company's capital stock is $200,000, the money invested being altogether Niles capital. The following are the officers of the company: George B. Robbins, president; A. G. McCorkle, vice-president; William Herbert, treasurer; A. L. Jacobs, superintendent; C. P. Souder, secretary and general manager; George E. Pratt, assistant manager and contracting agent.

The first shipment of cars will be made from the plant to the Aurora, Elgin & Chicago Street Railway Company. There are ten cars in this order, and each car is built to run 70 miles an hour. These cars are not supplied with a trolley pole, but will be run on the third-rail system, the power being taken from underneath. Whistles are used in place of bells. The cars will be shipped to their destination on their own bearings. The second order will go to Rockford, Beloit & Jamesville Railroad, at Wheatland, Ill. There are eight cars in this order. The next shipment, consisting of five cars, will be made to the Louisville, Anchorage & Peewee Valley Railroad. The company have a sufficient number of orders booked to supply them with work for a year ahead. At present there are 130 men employed.

OBITUARY.

WILLIAM FRAZIER GARRISON, senior member of the firm of Guild & Garrison, manufacturers of hydraulic and pneumatic machinery in Williamsburg, Brooklyn, N. Y., died on July 8 at his summer home in Morristown, N. J., aged 69 years. Mr. Garrison was born in Brooklyn, and when a boy was apprenticed to the machinists' trade. While still in his minority he formed a partnership with the late William H. Guild in the business with which he was connected up to the time of his decease.

DR. DANIEL J. RUNKLE, formerly president of the Massachusetts Institute of Technology, died at Mount Desert, Mass., of heart disease on July 9, aged 79 years.

LEROY ANDREWS of the Lobel-Andrews Company, manufacturers of ornamental iron work, died on July 11 at his home in New York City from heart disease after an illness of a year. Mr. Andrews was 38 years old, and was born in New York City.

HENRY F. AKIN, first vice-president and chairman of the Executive Committee of the American Can Company, died on July 4 at the Waldorf-Astoria Hotel, New York City, from typhoid fever.

GEORGE W. STEPHENS, founder and president of the Moline Plow Company, died on July 13, at his home in Moline, Ill., aged 83 years.

HARDWARE.

FACTORY shipments to the jobbers' customers, while made in the interest of the large distributer, operate in certain ways to his disadvantage. That by this means the great jobbing houses have in some measure helped on the movement to localize trade they are the first to acknowledge. The practice of bunching the orders of several merchants for Wire Cloth, Poultry Netting, Screen Doors, Fence Wire, Nails, Refrigerators, Steel Goods, &c., in order to make car lots of the different commodities, has been a valuable object lesson for the retailer. What is more natural than for the retailer whose shipment has formed a goodly portion of such a carload to figure that he might buy an entire car lot and by selling his neighbor at a slight profit reduce his own cost; or for two or three dealers whose goods were shipped in this way one year to combine to get the carload price and save the jobbers' profit? Then, too, the practice of ordering goods in all quantities from mail packages to car lots shipped direct from the manufacturer to the retailer has educated the retailer to look for shipments of goods from the factory and to consider why he might not send the order to the manufacturer himself, saving one profit and delay in receipt.

Direct factory shipments to retail merchants have also, by compelling the manufacturer to ship goods in small lots to a class of trade with which he has constantly grown more familiar, reduced the value of the connection with the large jobbers and made him less anxious for their favor. In many lines of goods he becomes acquainted with the entire trade of his jobbing customers, and knows where his goods are sold at retail by firms of whose responsibility the commercial agencies keep him fully informed. In time, the jobber changes a line of goods, dropping one manufacturer for another who will make him a lower price, but the manufacturer, if he cannot sell another jobber in the same market, still has it in his power to provide lively competition for his whilom friend and frequently does it—and every time a manufacturer sells a bill of goods to a jobber's customer he paves the way for a staple connection and gives impetus to the movement that is creating jobbers of the large retailers. The jobbers have not been blind to the consequences of their acts of this kind, but the present profit seems of greater value than the future protection, and the game goes merrily on.

The subject of special brands continues to call out communications from the trade. Those given in another column present the matter in various aspects, and written as they are by men in close and prominent touch with the trade are deserving of careful perusal. It is to be noticed that the communications which have come to us have been almost exclusively from the manufacturers and jobbers, while the retail merchants, whose judgment in the matter will have great influence in determining the question, have refrained from expressing themselves. They may, indeed, be regarded as the jury in the case, to whom the arguments of manufacturers and jobbers are addressed. It may be presumed that they are giving the matter careful consideration and that they will be heard from before long.

Condition of Trade.

The midsummer season is operating against activity in business, and as a rule the volume of trade is smaller than for some time. This applies to both the manufacturer and the jobber, who agree in reporting a falling off in the number of orders which are coming in to them. The force of traveling salesmen are, however, about getting into the field and are beginning to be heard from, and there is little doubt that their activities will result in increasing the volume of business. Manufacturers are generally endeavoring to give their plants the overhauling usual at this season, but many of them find the pressure of orders such as to make it a somewhat difficult task. In connection with the repairs and cleaning up many of them are making substantial additions to their factories or otherwise increasing their facilities. There is no doubt that the prosperous conditions which have prevailed have operated in giving manufacturers in nearly all lines a materially larger capacity, and at the same time there has been the encouragement of a good deal of competition, making the aggregate output in the various lines substantially greater than it was two or three years ago. This is notably the case in lines in which there have been strong organizations or dominant interests occupying a controlling position in the market. In some of these branches of the trade the new competition which is coming into sight, and is in some lines active in the field already, promises to give the trade wider and more diversified sources of supply than has recently been the case. Whether in all these lines the demand during the coming fall will be of such volume as to keep prices where they now are is a question which is being canvassed. Up to the present time most lines of goods are very firmly held, and in only a few are there indications of a slight weakening, and under the influences referred to above. In most departments of the trade the high price of material is giving strength to the market, and in a number of minor goods higher quotations are announced, while in the important line of Horseshoes the manufacturers have been compelled to make an advance. The strikes which command public attention have a perceptible effect in diminishing the volume of business, not only by their direct influence in interfering with trade, but in the uneasy feeling which they occasion, from which there results an indirect loss which is perhaps equally serious. Reports from the crops leave no doubt that the harvest as a whole will be most abundant, and in this fact, coupled with the existing wonderful prosperity, there is found basis for the confident anticipation of a heavy trade during the remainder of the year.

Chicago.

(By Telegraph.)

There has been a decided falling off in the number of orders received for all kinds of Hardware during the week. How much of this is due to the freight handlers and teamsters' strike is problematical, but beyond the orders for immediate shipment it is presumable that business is being held until settlement of the strike. There is a natural falling off of business any way at this time of the year, and in a number of instances the salesmen who came home for the Fourth of July have not returned to the active field. In the summer line of goods, too, business is about over, even in a retail way. There has been quite an active order trade, however, for fall goods, such as Axes, Potato Scoops, Stove Boards, Coal Hods, Elbows, &c. Several large orders for Wire Goods have also been booked. In the line of special and Shelf Hardware orders are being filled preparatory for shipment, as an outlet can be obtained through the railroads. Urgent orders have been shipped

by express. The price of Horseshoes has been advanced 25 cents per keg, but beyond this no changes have been made. A report reached this city from New York that the local branch of the United States Hardware Company had sold their stock of goods to Orr & Lockett Hardware Company of Chicago. This is denied by both firms, the United States Company emphatically announcing that they had no intention of suspending business; in fact, they have made contracts looking toward further developments. There has been less doing in Builders' Hardware, but special contracts are pending. Heavy Hardware is in very active demand; Wagon material especially is in urgent request, orders for Spokes, Hubs, Rims and lumber accumulating rapidly.

St. Louis.

(By Telegraph.)

The movement of Hardware products in the interval since our last report shows a decided increase in volume. The jobbing trade generally report a very liberal collection of orders well distributed among the different classes of staple goods, principally for fall requirements, as well as all varieties of Builders' Hardware. Some changes in price-lists have been announced and prices as a rule show a very firm tendency. Crop conditions are the important feature in the market, and it is said by the trade that feelings in this direction become more favorable day by day. The heavy department of the market shares in the favorable conditions as outlined above, and the volume of trade now in hand is of very large and satisfactory proportions.

Nashville.

Gray & Dudley Hardware Company.—The Hardware jobbers of this city report that business is up to the usual standard. Most of the traveling salesmen are now on the road taking fall orders and are meeting with considerable success. The orders that are being placed are fully as long as usual and for good quantities, covering a varied assortment of merchandise. Such goods as Guns, Cutlery, Wood Heaters, Coal Hods, &c., are beginning to be shipped out by the jobbers. Prices are very well maintained and the advances on Axes, Horseshoes, Hollow Ware, Bolts and other items are being observed.

The credit men of the different houses report their departments in satisfactory shape.

Cleveland.

The W. Bingham Company.—At this time of the year many of our traveling salesmen are taking their annual vacations. This, of course, makes a little let up in orders in some sections, but those who are still at work are having a very good trade for this time of the year.

There is a good demand for Carpenters' Tools and House Trimmings, showing there is no let up in the general building line. Manufacturers all seem to be busy and are ordering their usual line of supplies.

The heavy rains that we have had all over the country for the last week or ten days have somewhat interfered with trade, but, on the whole, a satisfactory volume of business has been coming to the jobbers of Cleveland. Quite a number of orders are coming in for Haying Tools, although there was a large volume of business done early in the season on these goods. There have been a great many orders booked for future shipment—that is, for what are called fall goods—viz., Stove Boards, Coal Hods, Elbows, Meat Cutters, Stuffers and Lanterns, and it would seem advisable for the retailers to take them in stock now or to allow the jobber from whom they bought to ship at his option, that the goods may be in stock in time, as there is always a shortage of these goods in the season of their use.

St. Paul.

Farwell, Ozmun, Kirk & Co.—The first half of 1902 passed with as little to disturb the even run of trade in all lines throughout the country as it is often permitted to see.

With the exception of some parts of the country that are affected by floods and strikes, the general situation is certainly very satisfactory. The crop conditions are generally favorable, farmers are receiving higher prices for nearly all they have to sell, the demand for goods is large, trade has been extending on all sides, and, fortunately, the situation has been such, both at home and abroad, that prices have been substantially well maintained, notwithstanding the enormous production. If present crop conditions be fairly well realized the last half of the year may be reasonably expected to hold its end of the business and 1902 will stand in the list of very prosperous years.

But we have learned in the school of experience, as well as in the realms of poetry, that "There's many a slip 'twixt the cup and the lip," and so we wait as patiently as we can for what the future has in store for us, and are deeply thankful for what we already have. One lesson that has been pretty effectually learned, and the fact should not now be forgotten, is to prepare in prosperous days for the days of depression that are sure to come sooner or later.

This is the lesson for us all as we pass these milestones at the middle and end of the year. As yet there is no sign of the approach of those days, but if we prepare for them while we may we shall be wise.

Baltimore.

Carlin & Fulton.—Business keeps up a little above the normal for this season of the year, which is generally considered rather a quiet month for trade.

It is the season for vacations and our country friends are now acting as hosts to the visiting city cousins. Favorable weather has facilitated all kinds of outdoor work, whether in city or country. The only drawbacks are the unsettled feelings of labor and the strikes, which are occurring quite often.

The conditions of the market arising from the higher costs and scarcity of raw material, fuel and labor seem to have given occasion for several advances in the price of a number of commodities, including Horseshoes and Stove Hollow Ware. Porcelain Lined Preserving Kettles seem to have been out of the market for some time.

The wheat and hay crops in this section have been very poor this harvest, but every other growing crop promises well. Our men write quite hopefully concerning the prospects for fall trade, and we hope and believe as far as we can tell that their expectations will be realized.

Omaha.

Lee-Glass-Andreesen Hardware Company.—The favorable business conditions that have prevailed in this section of the country for some time past still hold good, with the exception of a temporary and slight diminution in volume, caused by a superabundant supply of moisture, which has retarded field operations to some extent.

The country tributary may be reported as continuing in a remarkably prosperous condition. Farmers are obtaining substantial values for all their productions, and as the small grains crop just harvested proved to be of excellent quality and a heavy yield, the general condition of affairs throughout the country districts may be considered as very satisfactory.

Bank clearings continue to show a steady increase, and taking this recognized business thermometer as an indication of the state of trade hereabouts, it would appear that the present situation is an assurance of future prosperity for at least a reasonable time ahead.

Portland, Oregon.

Corbett, Failing & Robertson.—There is little that is new to report in the Pacific Northwest. Orders are coming to hand both by mail and through travelers with the same regularity heretofore reported.

There has been a change in the weather that makes the prospect for every section of this territory as bright as it has ever been in the past. Up to date the weather has been cold and backward for the season, but now it is all that could be desired.

Oregon and Washington will turn off a record breaking crop of wheat from present outlook, and at fair price. Hops are already being contracted as high as 16 and 18 cents, and as it cost but 6 cents to raise, pick, cure and bale them, there will be a fine margin for the growers.

Collections are as good as could be expected at this time of the year.

NOTES ON PRICES.

Wire Nails.—Demand for Wire Nails from the mills is moderate, orders being confined, for the most part, to small lots. The mills are generally reducing their production materially pending repairs and cleaning up, and also to avoid undue accumulations of stocks. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots	$2.05
To jobbers in less than carload lots	2.10
To retailers in carload lots	2.10
To retailers in less than carload lots	2.20

New York.—Local demand for Wire Nails is considered somewhat beyond what is usually expected at this season. Quotations remain unchanged, as follows: Small lots from store, $2.30; carloads on dock, $2.18 to $2.20.

Chicago, by Telegraph.—With the exception of two or three large orders for shipment during the latter part of August business has been light, but the market has remained firm. The demand from store has been only moderate. Single carload lots are selling at $2.20, and small lots at $2.25 to $2.30 from store.

St. Louis, by Telegraph.—The demand for Wire Nails is still of a quiet order, and no change is to be reported in the price-list. Carload lots bring $2.25 and small lots from stock $2.30.

Pittsburgh.—The Wire Nail market continues dull, and will likely remain so until fall trade opens up. Output has been very much reduced by the shut down of a number of mills, and this ought to prevent any large accumulation of stocks. We quote Wire Nails at $2.05 in carloads, and in some sections of the country this price is slightly shaded.

Cut Nails.—Conditions in the Cut Nail market continue as at our last report. The demand is fairly active with a scarcity of Iron Cut Nails. We quote: $2.05, base, in carloads and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—Cut Nails are in moderate demand at this point. Prices are unchanged at the following quotations for carloads and less than carloads:

Carloads on dock	$2.18
Less than carloads on dock	2.23
Small lots from store	2.30

Chicago, by Telegraph.—There has been only a moderate movement in Cut Nails in general. There has been an especially active demand for Floor Brads, which are scarce. Sales are made from store at $2.30 for small lots.

St. Louis, by Telegraph.—A steady but not heavy demand is reported in Cut Nails and $2.40 is the quotation for small lots from jobbers' stock.

Pittsburgh.—Mills are making much better deliveries of Cut Nails, but in some cases delays on the railroads are inconveniencing buyers to some extent. We quote: $2.05, base, in carloads and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—There is but little activity in Barb Wire, as far as the mills are concerned. New business is light and demand is confined to small lots. The mills which have until recently been crowded with orders are letting up in their efforts and curtailing production. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days:

	Painted.	Galv.
To jobbers in carload lots	$2.60	$2.90
To jobbers in less than carloads	2.65	2.95
To retailers in carload lots	2.70	3.00
To retailers in less than carloads	2.80	3.10

Chicago, by Telegraph.—One or two liberal orders have been received by the mills, but with this exception business has been quiet and prices have varied but little. Galvanized is quoted at $3.10, and Painted at $2.80, for carload lots, with 5 cents extra for small quantities.

St. Louis, by Telegraph.—The demand for Barb Wire is now of a light order and in the matter of prices firmness is the rule. Painted at $2.90 and Galvanized at $3.20.

Pittsburgh.—A fair amount of business is being placed for this season of the year, but some of the mills are in need of orders. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.60; Galvanized, $2.90; less than carload lots, Painted, $2.65; Galvanized, $2.95.

Plain Wire.—Mills are running on old contracts to a large extent, current orders for Plain Wire being light. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. for cash in 10 days:

Base sizes.	Plain.	Galv.
To jobbers in carload lots	$2.00	$2.40
To jobbers in less than carload lots	2.05	2.45
To retailers in carload lots	2.05	2.45
To retailers in less than carload lots	2.15	2.60

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	Base					$0.40	extra
10	$0.05	advance	over	base		.40	"
11	.10	"	"	"		.40	"
12 and 12½	.15	"	"	"		.40	"
13	.25	"	"	"		.40	"
14	.35	"	"	"		.40	"
15	.45	"	"	"		.75	"
16	.55	"	"	"		.75	"
17	.70	"	"	"		1.00	"
18	.85	"	"	"		1.00	"

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—The market has been very quiet, new orders booked by the mills have been of the usual summer proportion, and the jobbing trade has been moderate with some irregularity in prices. Sales of jobbing lots are made mainly at $2.20 from store. Some urgent orders have been received during the past few days and shipment made by express.

St. Louis, by Telegraph.—The customary condition of light demand rules in the market for Plain Wire, and in the matter of prices generally firm conditions are maintained. No. 9 is quoted at $2.25 and Galvanized at $2.65.

Pittsburgh.—Demand is somewhat dull, and some of the mills are accumulating stocks pretty rapidly. It is said there is some unevenness in prices owing to light demand and the large output. We quote Plain Wire at $2, and Galvanized at $2.40, in carloads, f.o.b. at mill.

Sinks.—The market for Cast Iron Kitchen Sinks is characterized by some irregularities. The manufacturers are quoting independently of any agreement, and prices are considerably divergent. There is a scarcity in some of the leading sizes, and most of the manufacturers are considerably behind their orders.

Casters.—The manufacturers of Casters have recently been withdrawing some of their extreme discounts, and the market is accordingly slightly higher, and is characterized by a firm tone.

Horseshoes.—An advance of 25 cents per keg was made by the associated manufacturers of Horseshoes at their meeting in New York 11th inst. This advance makes the price of Iron Horse and Mule Shoes $3.85, and Steel Shoes $3.60 per keg, f.o.b. Pittsburgh. The manufacturers have pursued a conservative course in the matter of prices, and in connection with this advance it may be noted that the total advance in price since January, 1901, is but 35 cents per keg, while the price of Muck Bar during the same time has gone up from $25 to $35 per ton; Steel Billets from $21 to $32, and No. 1 Wrought Scrap from $15 to $22. In addition to this labor has advanced fully 10 per cent., and coal about the same. A conservative estimate represents the advanced cost of Shoes since January, 1901, to be 50 cents per keg. The manufacturers fought the advance for months, but were finally compelled by the outlook to cover part of the advanced cost. A moderate advance has also been made in the price of the Burden Shoes.

Axes.—The manufacturers of Axes, at their meeting to-day, made an advance of 25 cents per dozen on all kinds and patterns. As most of the orders for the coming season have been placed the jobbers are in a position to reap the advantage resulting from this action.

Axles.—The market for Wagon and Carriage Axles is decidedly firm, and there is some prospect that a further advance will be made before long.

Hollow Ware.—A further advance has been made in Stove Hollow Ware, and the market is characterized by a decidedly firm tone.

Oilers.—The agreement between the manufacturers of Oilers, Brass, Zinc, &c., has terminated, and the market is now an open one. Somewhat lower prices are being announced, but no very serious irregularity has as yet developed.

Binder Twine.—The demand for Binder Twine, as far as manufacturers are concerned, is practically over for the season. There is considerable urgency just now in the Northwest, where Sisal and Standard Twine is being sold at 13½ cents per pound. There is little, if any, call for Manila or Pure Manila Twine, on account of price.

Cordage.—The distribution of Rope continues moderate in volume, but satisfactory for the season. Quotations, according to maker, range from 9¼ to 9½ cents for Sisal on a basis of 7-16 inch and larger, and from 12½ to 13½ cents for Manila on the same basis, with ¼ cent rebate on both kinds for large lots.

Glass.—The meeting of Window Glass manufacturers, which was held at Cleveland, Ohio, on the 10th of this month, is reported as being harmonious, as well as the largest in the history of the business, more than 3000 pots being represented. A committee was appointed to confer with the Independent Glass Company and other outside manufacturers not present, and arrange for co-operation in regard to the time of starting the fires in Glass factories in the fall. It was the sense of the meeting that the blast of 1902-03 should not begin earlier than October 15, and not continue longer than eight calendar months. A paper devoted to the Glass interests remarks that there is little doubt that most of the Glass made this year has been sold by the manufacturers, and that they have not as much now as at the beginning of the year. The opinion prevails that should the Independent Glass Company change their attitude the result would be a big combination and higher prices for Glass. The Jobbers' Association quotations are as follows for single and double strength:

	Discount.
From store	88 and 5 %
F.o.b. factory, carload lots	89 and 5 %

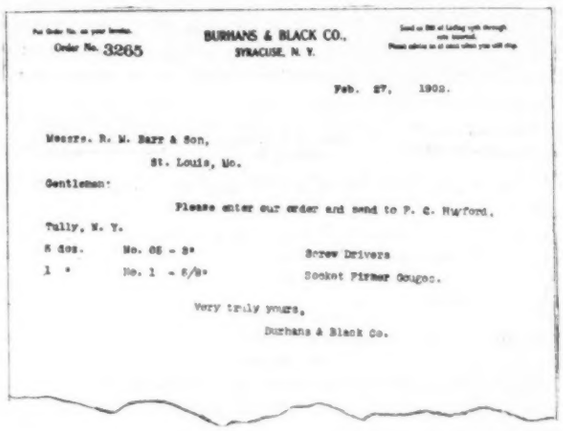
Oils.—*Linseed Oil.*—The amount of Linseed Oil that has been purchased during the first half of the year has been light in comparison with previous years. This may probably be accounted for in part by the Corn Oil which has been used as an adulterant in the manufacture of Paints. The demand for Linseed Oil at present is very small. There is some Oil which was purchased at low prices which is being offered at about 1 cent lower than the regular quotations. Oil is being offered for delivery during October, November and December at 46 cents per gallon in large lots. There is a report current that the price of Oil will be forced up during August, but in this event it would seem necessary for the controlling factor to purchase from 3,000,000 to 4,000,000 bushels of seed, which is the estimated amount of the Southwestern crop, the first of which is due in Chicago about the 25th of this month. The planting of Flax Seed indicates an estimated crop for the entire country of about 30,000,000 bushels, the largest ever raised. It is estimated that a considerable quantity of Oil will be carried over to the next crop. If all these estimates prove correct the outlook for natural, not fictitious, conditions ruling in the Oil market is good, with lower prices. The Sherwin-Williams Company of Cleveland, Ohio, have completed a plant for making Linseed Oil for their own use and also for sale in the general market. Quotations, according to quantity, for City Raw are 67 to 68 cents, and out of town Raw 66 to 67 cents per gallon.

KEEPING TRACK OF UNFILLED OR PARTLY FILLED ORDERS TO MANUFACTURERS.

IN the system used by Burhans & Black Company, Syracuse, N. Y., for recording orders to manufacturers which are unfilled or only partially filled, a carbon copy of every order sent out is retained. Order blanks, of which three are here shown, are all printed on double sheets, one sheet being for the order mailed to the manufacturers, the other, a carbon copy, being retained and filed in the office. The order sheets are folded and perforated at the fold, and the typewriter inserts a sheet of carbon between the two when placing the blank in the machine to write the order. After the order is written the sheet of carbon is removed and the two sheets are torn apart. There is no printing on the carbon copy except the order number in the upper right hand corner. On the printed forms, it will be seen, the order number is placed in the upper left hand corner.

Unnecessary Instructions.

The directions or instructions to manufacturers may be made as elaborate as desired, but the company's experience has been that no attention will be paid to them if too much is requested. They therefore place no instructions on their forms beyond the one in reference to putting their order number on invoices, sending bill of lading with through rate inserted, and advising how soon shipment will be made. They want parties billing goods to them to put their order number on the invoices, as it makes it very convenient to find the order to which invoice applies. They wish them to send bill of lading with through rate inserted, because it is often necessary



Order No. 3265

BURHANS & BLACK CO.
SYRACUSE, N. Y.

Feb. 27, 1902.

Messrs. R. M. Barr & Son,
St. Louis, Mo.

Gentlemen:

Please enter our order and send to P. C. Hufford,
Tully, N. Y.

6 doz.	No. 08 - 8"	Screw Drivers
1 "	No. 1 - 8/8"	Socket Firmer Gouges.

Very truly yours,
Burhans & Black Co.

Fig. 1.—Order for Goods to be Shipped Direct to Customer.

to have this information, not only on shipments for stock, but also direct to customers, where goods are sold to the company with full freight allowance.

Numbered Order Sheets.

The orders are all numbered in series of 1000 each, starting the files with A1, A2, and so on, and then the next series with B1, B2 and so on. The carbon copies are filed in three ordinary box files. One of these has a regular index and in this are put all of their miscellaneous orders. Another one is indexed with the names of those concerns to whom they send more than the average number of orders. They thus have the orders to each of these concerns filed in a separate division and have only the one place to look, and no other orders to handle but those to the one concern. There are a great many orders which are held for a long time on account of specifying seasonable goods to be shipped ahead; as, for instance, when sending in orders for fall goods to be shipped direct to customers in September. They put these future orders in the third file, in which they are indexed by the name of the goods, instead of that of the manufacturer. For this file only lines of goods are selected for which more than the average number of orders are sent.

Orders Direct to Customers.

The order to R. M. Barr & Son, in Fig. 1 ,shows the form of the company's orders for goods to be shipped direct to their customers. Such orders as these are usually taken by the stenographer from the salesman's sheet. The salesmen are required to enter orders for direct shipment on separate sheets, but it often happens that items sold to be shipped from store are eliminated from such orders and ordered to be sent direct from the factory. In such cases as these they are entered separately, in the office, on that particular salesman's sheet. These salesmen's sheets for direct shipment are all put in a file by themselves and remain there until the invoice is received from the manufacturer.

When the stenographer makes out the order to the manufacturer from the salesman's sheet she notes on the latter the name of the manufacturer, date and the company's order number, so that if any inquiry comes in from the customer regarding an order of this kind they have only to look in the file for the salesman's sheet and get information as to the number of the order and the name of the manufacturer to whom it was sent. As soon as the invoice is received the sheet is taken from the file, priced and extended; then the invoicing and bookkeeping is done from the same sheet.

Back Orders.

The order to the Greenfield Mfg. Company shown in Fig. 2 represents what is described as a back order or a special order. Sometimes there is an item on a dealer's order which is not in stock, but which he wishes them to send him with other goods; or there may be an item which is not regularly carried in stock that he has requested them to obtain for him. To take care of orders of this kind there is in the buying office what is called a Back Order Book, on which all such items are entered, with the name of the party for whom they are intended. The stenographer makes an order to the

Order No. 3266 BURHANS & BLACK CO., SYRACUSE, N. Y.

Feb. 27, 1902

The Greenfield M'f'g Co.,
Greenfield, Mass.

Gentlemen:

Please enter our order and send us---

2 only Greenfield Planters.

Very truly yours,
Burhans & Black Co.

Fig. 2.—Back Order.

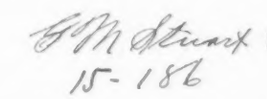
manufacturer out directly from this book, which is, of course, indexed. The date of the order is entered on the book and, on the carbon copy of the order to the manufacturer is written in ink the name of the customer for whom the goods are ordered, also the number of the order book and page. A number is given to the Back Order Book because it is easier to refer to it in this way. On the carbon copy is written the name G. M. Stuart & Co., and under it two numbers separated by a dash; the first is the number of the Back Order Book and the second is the page of the same book on which the order is entered, as shown in Fig. 3.

Checking the Invoice.

When the invoice for this particular lot of goods is received from the manufacturer the party who checks off the orders writes on the invoice, or on a slip of paper attached to it, the name of the customer for whom the goods were ordered. This is a guide for the receiving clerk, who thus knows whether the goods are for stock or are already sold. In the latter case he would not put them in stock but would take them at once to the shipping room to be sent with other goods to the customer. When checking off the orders from invoices the order number is always entered on the corner of the invoice so that the order may be found without difficulty if there is occasion to refer to it after a lapse of time. The order to the National Can Company, Fig. 4, represents one of the company's regular stock orders.

Filing Orders.

As previously stated, the order blanks are all numbered consecutively. The young woman who has charge of them files them every morning and indexes them at



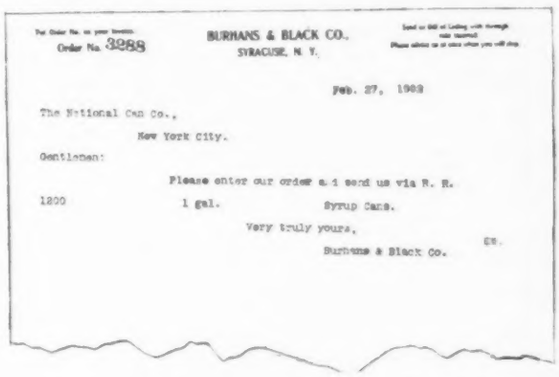
G M Stuart & Co.
15-186

Fig. 3.—Name of Customer, Number of Order Book and Page.

the same time in an ordinary index, such as is used in a tissue copying book. When one series of 1000 orders is completed another index is started, labeling it A, B, or C, &c., as the case may be. As these orders are placed in the files they are arranged according to number, consecutively, with the lowest numbers or the oldest orders at the bottom—that is, the orders are laid in daily, the last orders or highest numbers are simply placed on top of the others consecutively in the division of the index and file where they belong. To find an order, therefore, it is necessary only to look at the general index and get the number and then take down the file in which the order should properly be placed and turn to it just as to a page of a book.

Transferring Filled Orders.

As the invoices come in they are checked off against the orders, and no order is removed from any of the files until it is filled complete; then it is transferred to another ordinary box file, from which the index has been removed. One of these box files will hold comfort-



Order No. 3288 BURHANS & BLACK CO., SYRACUSE, N. Y.

Feb. 27, 1902

The National Can Co.,
New York City.

Gentlemen:

Please enter our order & send us via N. R.

1200 1 gal. Syrup Cans.

Very truly yours,
Burhans & Black Co.

Fig. 4.—A Regular Stock Order.

ably about 1000 orders. These files for the filled orders are labeled on the back, the first one being marked "Series A, Filled Orders, January 1 to February 17, inclusive," or otherwise as the dates may happen to be different from these; the next one would be "Series B, Filled Orders," &c.

The Condition of Orders

In looking for an order, to discover whether it is filled or only partially filled, they look first in the general index and get the number, then in the unfilled order file in which it should properly be. The checking on the order will indicate at once what part has been filled and what remains unfilled. If it is not found in the unfilled file the filled order file is turned to, in which the orders have been laid in the same manner as in the unfilled order file—that is, with the lowest number at the bottom and then consecutively to the highest number, which is on top. Knowing the number of the order it only requires a moment's time to turn to it in the filled order file and discover the date on which shipment was made. As the invoices are checked against the orders the date of each shipment, which is the date on the invoice, is entered on the order, so that to learn when goods leave the factory or how long they have been on the way, the order is looked at for the date of the invoice.

SPECIAL BRANDS.

ARGUMENTS PRO AND CON.

We give below communications which have come to us from persons who are representative of manufacturing and jobbing interests, in which the question of special brands is discussed in various aspects. Two of the articles represent the position of manufacturers, who are almost universally opposed to the making of special brands, while another article represents the views of the jobbing trade, so many of whom are in favor of the practice:

A JOBBER'S ARGUMENT FOR SPECIAL BRANDS.

The matter of special brands for the wholesale dealer is one of considerable importance to the trade. I read the article by Mr. Douglas in *The Iron Age* of July 3 with much interest, and can think of no better argument to be made in favor of special brands. In the same issue of the journal is an article by "H. C. W.," which is called an argument against special brands, but after a careful re-reading I fail to find the argument. As "H. C. W.'s" experience is limited to "two or three times in a selling experience of 20 years," perhaps it is not strange that his lack of experience will also account for the lack of "argument" in his article.

The writer, as salesman and merchant, has has a continuous experience with private brands of 35 years, and the files of *The Iron Age* will show an article from his pen a few years ago, not only in favor of special brands, but particularly recommending retailers to have their own brands on goods, and by pushing these build up a trade that must be personal and permanent.

It is desirable in the wholesale trade to have one's own brands.

Why?

Not for the reason given by "H. C. W." "that no jobber has any other object than that of more profit in the goods sold." This is not the truth; not even half the truth.

The dealer, be he wholesaler or retailer, must face one fact the moment he opens his door for business—he is trying to succeed by selling other men's goods. As a jobber, he has no advantage over any other jobber. His men and other men will scour the same territory, selling the same brands largely, and at very nearly the same prices. He can hardly claim one customer as his own, for if the trade so choose they can get the same goods, the same brands and the same or perhaps slightly better prices of some other wholesaler.

As he gains experience he discovers that he and his men have been working a year or two creating a demand for a certain article, giving the house's personal guarantee as to quality and salability, and when they have finally established its good name with the retail trade, find their competitor is handling it and taking advantage of the work done by him and his men.

This naturally sets him to thinking. Suppose the article was Smith's Axes. He has established Smith's reputation in his territory, and Smith and his competitors have the benefit of his work. But if, instead of pushing the Axes under Smith's label, he had ordered them with his own label? He could have introduced them as easily, to say the least, as he did when under the maker's label. And the retailer and his customers, having found the Axes all the jobber claimed for them, will buy them again, but will buy of the jobber, and not of the jobber's competitor, who had no part in the work of introducing them.

I went "on the road" in 1866, carrying two Axes with me, both made by Wm. Mann, Jr., & Co.; one Axe had Mann's regular label on it, the other Axe had the label of the house I was working for. Both cost the same; were sold for the same price, and were warranted exactly in the same words.

Please put that fact against the "argument" of "H. C. W.," who says the special is pushed "for the paltry reason always given that the special is as good and costs less."

I sold 300 dozen Axes on my first trip, and 90 per cent. of them was our own brand! Every one knows, unless his experience is so limited as "H. C. W." confesses his to be, that the retailer assumes that a jobbing house will not put its brand on an article unless it is absolutely sure that the quality is in every way up to the standard.

Of course, I am talking of labels that bear the name of the jobber and his guarantee. I am not including fancy names that mean nothing; that, like the mule, "have no pride of ancestry or hope of posterity." If such are sold on their own deserts the retailer has no grievance if he buys them. If they are sold under the jobber's guarantee the retailer is amply protected; for, be it said in the jobber's honor, his word is lived up to every day in the year.

"H. C. W." says: "We all know the pleasure of selling a good Tool, of thoroughly reputable make, and whose warrant applies if the goods go wrong."

Yes, we do. That is the statement I heard when I tried to get my customers to try a Disston Saw, instead of the Spear & Jackson they had been selling. I heard it again when I was talking Rothery Files to take the place of Butcher's, and later when I tried to put American Cutlery in stock in place of English.

But there is another side to it, even from the retailer's standpoint. Do the "thoroughly reputable" goods pay the best profit? If two or more concerns in the same town are handling Smith's Axes under the factory brand, are they getting as good prices as if they each had a special brand? The question answers itself. The goods known as leaders in both wholesale and retail stocks are the goods that are "thoroughly reputable," and so well known that they have to be sold at cost.

The statement that houses with special brands send "all over the country for bids" is ridiculously untrue. I am no "holier than thou" dealer, nor built on any different plan from the ordinary jobber, and while I handle many different lines under my own brand I never yet sent out for bids, and never saw any occasion where such a course would suggest itself. In my leading lines the Saw makers have given me their goods under my brand for more than 25 years. And I know—mark that word know—that those put up for me specially average better than the goods sent out by the makers under their own brands. The two are side by side on my shelves, and I am watching jealously all the time to see how the goods appear.

Were I a retailer with a fair trade in leading goods I would have identically the same reasons for selling under my own brand as influence me now as a wholesaler. And all reasons sum themselves into this one: To hold my customer. The dealers of the country—wholesalers and retailers alike—have, by persistent recommendation, representation and personal guarantee, built reputations for scores of leading brands of goods, and what is one very noticeable result? When a department store wants to advertise a special cut price these are the goods invariably selected. If a mail order house gets out a catalogue these are the goods placed in the front as baits, and the local dealer must meet these cut prices or be known as a high priced man.

Take a certain brand of Silver Plated Ware as an example. Does any sane man believe that this one shop has any greater ability, any more honesty, any higher idea of business sense than all other shops in that line? We all know, as dealers, from personal experience, that a dozen concerns turn out as honest and as well made goods in every detail. Yet we talked this one brand as the standard for so many years that we have educated consumers into the belief that there is but this one on earth, and what is the result? There is about as much profit in Plated Knives and Forks as there is in Nails!

I do not expect to see the day come when special brands will disappear. There is no good reason why they should go. But I think the better class of retailers will either have their own brands, or handle only such as they can control in their territory.

A MANUFACTURER'S ARGUMENT AGAINST SPECIAL BRANDS.

The retail Hardware dealers who read *The Iron Age* no doubt feel great interest in the articles which are now appearing in the columns concerning jobbers' special brands. If they will carefully read these articles and apply them to their own individual business they will get pointers which will prove of much value to them. This discussion has now narrowed down to one question—viz., whether it is to the interest of the retail Hardware dealer to buy and sell jobbers' special brands or manufacturers' brands.

It is waste of words to discuss whether it is to the interest of the manufacturer to remove his own brands and substitute that of the jobber. No wide awake manufacturer, alive to his own interests, would willingly do this, and it is only stress of competition and other forces which have compelled so many of them to do it in the past. There is only one side to this part of the question—viz., that a manufacturer is simply throwing away his birthright to thus obliterate his own good name and good will.

This case is equally true with the jobber: It goes without saying that any jobber who can induce or coerce a manufacturer to obliterate his name from his best goods and substitute the jobber's name will, of course, do so, and he is not to be blamed. It is simply a question of whether the manufacturer is weak enough to do so or not. The jobber's interests in this matter are so perfectly apparent that no discussion is needed on this subject. He who runs may read.

But when it comes to the retailer he is confronted by many arguments. The last article on the subject is from the pen of A. W. Douglas, secretary of the Simmons Hardware Company, and is an able presentation of the case in the interest of the jobber. Every retailer who reads this article could see that the argument consisted of the following points:

First. That the retailer should confine his purchases to certain well-known jobbers' special brands of high quality, and Mr. Douglas even goes so far as to intimate that manufacturers may put up these special brands of a higher grade and finish than their own corresponding brands. No retailer is likely to be impressed with this argument. The very fact that the factory where the goods are made is carefully concealed from the retailer should be sufficient evidence to him that the managers of this factory could not possibly be so solicitous about the quality of jobbers' brands as they are of their own brands. No successful manufacturer of to-day would dream of thus subordinating his own interests to those of any jobber without any hope of future reward for it.

Second. The retailer is offered the argument that the jobber's quality is more likely to be kept up to a higher standard than the manufacturer's, for the reason that the manufacturer may die, &c., while the jobber lives on forever and watches his quality with zealous eye. The jobber is just as likely to get sick and die as the manufacturer, and the stability of factory management is far greater than that of a jobbing house.

As proof of this retail merchants can name many manufacturers in this country who have been in business 25 to 50 years and whose goods are better and cheaper than ever, although the factory may be managed by the sons or successors of their founders. On the other hand how many jobbers can be found with such a record? Not one. And even the old ones of those in the trade would have gladly transferred their business into other hands recently if it could have been accomplished. The retail Hardware trade are fully aware of these facts and are not likely to be impressed with the wonderful supervision with which jobbers watch the details of the manufacture of all their goods. These jobbers have been too busy trying to sell out recently.

Third. The retailer is urged to buy jobbers' private brands for the reason that he can thus secure an "harmonious line of equal merit throughout," &c. Now, this will scarcely appeal to an intelligent retailer. In some cases it would be a decided disadvantage to him to have all of the goods of the same appearance. "Variety is the spice of life." And as to the goods being of equal merit because they have have the same label on them, that is absurd, because they are made at entirely different factories and under different management.

Fourth. The retailer is told that in the case of claims or in the matter of guarantee the adjustment is much simpler with the jobber's brand than with the manufacturer's brand. The experience of the retail trade will not bear out this statement. Many a retailer has been confronted by the statement from the jobber, after a broken tool is returned, that he (the jobber) is helpless in the matter, because the factory will not guarantee the goods to him. But if the retailer is selling the manufacturer's brand he has the recourse of appealing over the head of the jobber to the manufacturer whose name appears on the Tool, and can thus get satisfaction. This is a very important point, and the retailer will appreciate it after he has given it consideration. If he buys the jobber's special brand he is completely at the mercy of the jobber in the matter of reclamation for poor goods. But if he buys the manufacturer's brand he always has a higher authority than the jobber to appeal to and can thus always secure a fair adjustment.

Fifth. The retailer is told that when he handles a jobber's private brand "he has always a line of goods in which he has practically no competition, for his competitor handles a different brand, &c." Now, this all depends. It may be that in certain towns one retailer can secure the exclusive sale on a jobber's special brand. But on the other hand his competitor across the street can secure the exclusive sale on another large jobber's special brand and make every claim for his goods which the first retailer can make, and thus there is a complete stand off between them. On the other hand the retailer can secure the exclusive sale in his own town on a certain manufacturer's line, and while his competitor may have another manufacturer's line, there is a greater advantage to the retailer in this situation than in the former, because he has the makers of the goods behind him at all times, while the one who handles the jobber's brand is comparatively helpless.

Sixth. The retailer is told that in dealing with the jobber he does not have to invest a lot of idle money in stock, &c. We fail to see where this is any argument in favor of the jobber's private brand. The retailer in order to buy the manufacturer's brand does not "have to invest a lot of idle money," at all, and has the inestimable advantage of being able to buy this brand at any time from a number of competing jobbers, and after all here is the real interest of the matter to the retailer Hardware dealers of the United States.

When he buys a jobber's special brand and has built up a trade on it he is completely at the mercy of that jobber in the matter of reclamation and price. On the other hand, by the expenditure of a few cents in postage stamps he can get from a dozen different jobbers competing prices on manufacturers' brands on the same goods, and thus be always on the ground floor in his purchases. The old saying, "Goods well bought are half sold," applies just as well to the retailer as it does to the jobber, and how any retailer in his senses could thus deliberately tie himself up to one jobbing house, when by handling a manufacturer's brand he can have free and open competition in his purchases, is the question which the trade are rapidly solving for themselves in the most practical way.

Seventh. The retailer is told that his greatest enemy, the catalogue house, cannot secure the jobber's special brand. While this may be true, it is equally true with many prominent manufacturers who refuse to sell their goods to catalogue houses. This argument falls flat because it applies quite as well to manufacturers' brands as to the jobbers' brands.

In conclusion, the retailer should carefully consider:

First. That it is only human nature for the manufacturer to put more care in the production of an article which bears his name than in one from which his

name is carefully obliterated and the jobber's substituted.

Second. That the jobber's main reason for wanting the manufacturers' name off the goods and his own substituted is to enable him to ask a higher price for the goods from the retailer. And if the retailer builds up a trade on this jobber's goods he is in the hands of an ideal trust, which can always exact from him a tribute which he has no means of opposing, as the jobber has no competition on his private brand.

Third. When the retailer wants prices on any line he can get them from many competing jobbers in manufacturers' brands. His goods will thus be "well bought," and at any time if that jobber does not treat him right he can buy the same goods from another jobber, thus being independent, and by being independent can always command better treatment than if he is in the hands of one house.

Fourth. The up to date retailer, who buys nothing but the best factory brands, thereby places himself closer to the factory than if he has a jobber's brand, whose make is carefully concealed. Such a retailer, thus learning the names and addresses of all the large manufacturers, can at any time communicate directly with them and thus enlarge the number of lines he buys direct. He can utilize the jobber for carrying his miscellaneous stock for him, but can gradually buy direct all the leading staples and increase his trade and profits.

SPECIAL BRANDS AND THE CATALOGUE HOUSE.

BY A MANUFACTURER.

That the retail dealers are well organized in nearly all States for protecting their interests and bettering their conditions mainly against the catalogue house, which is undoubtedly one of the great evils that they have to contend with, is a fact; but is it not strange, to say the least, that no effort has been made or directed against the one great evil, that of the "special brand?" The jobbers are mainly the cause of the existence of the catalogue house. Why? Because they require the manufacturer to produce for them imitations of well-known established factory brands for, say, one-third less than the regular goods under a special brand. That such article is inferior is conceded by all, the manufacturer, the jobber and the retailer, and certainly does not stand the test with the consumer. The retailer is loaded up with special brands by the enterprising salesmen of the jobber under instructions given by the house to push the sale of "specials" to the exclusion of all other brands.

All jobbers have their "specials," imitations of the factory goods, and their stock of such is never permitted to run low, while manufacturers' brands, on the contrary, are always a secondary consideration. They can supply "specials," but, of course, under the circumstances, not so the factory brand article. That they pocket larger profits by urging the sale of these inferior goods goes without saying. This may continue for a time, but the consumer's opportunity has come along with that of the catalogue house, and the former will insist upon fair treatment.

The retailer is loaded up with "specials" bought of the different jobbers he patronizes, and in many instances, unfortunately, he has not the necessary capital to carry a sufficient stock of factory brands in addition.

While the consumer has satisfied himself that special brands are inferior to factory brands, he finds that not only the brands he desires are listed in the catalogues issued by the catalogue houses, but a full, well kept stock at a price equal to the special brands (inferior though the latter be) as well; for the catalogue houses make their run on factory brands, knowing full well the advantages accruing to themselves in so doing.

Many manufacturers sell the catalogue houses in self defense, because in such instances it is the only means they have to keep their own brands before the public. Catalogue houses would not sell a special brand article if they could obtain goods of the manufacturer with the maker's brand on them, specializing only on such goods as the manufacturer will not sell them under the factory brand. Give the retailer an opportunity to satisfy his trade by supplying him with factory brands, letting the catalogue houses handle the "specials," and the situation would soon be materially improved.

ASSOCIATION POINTERS.

THE WISCONSIN RETAIL HARDWARE ASSOCIATION, which is active and enterprising in its methods, has recently issued a folder containing some matter directly connected with its work, but giving also a number of suggestions which are of general interest. From these we extract the following:

In many towns some outside party does the delivery for a dozen or 20 firms, four deliveries a day, at from $1 to $2 a week each, and while it is much cheaper for the retailer the expressman also makes a good thing.

The show window of a dealer's store should be one of the best advertising mediums at his command and one of the cheapest. Is yours a catch-all for odds and ends? Try the experiment of changing them and washing them once a week and filling with only one kind of seasonable goods at a time. One dealer this summer floored his with tame sod, kept it sprinkled, filled it with Hose, Sprinklers, Grass Hooks, Lawn Mowers, &c., and the grass grew until it had to be cut three times, but it stopped many a passerby. Cost, three hours' work getting sod.

One member of the association doing a $30,000 business with $3500 on his books May 1, reports $1700 collections for the month of May. Perhaps some member has a record that will beat it.

Why is it, that in some towns the retail trade pull together harmoniously, while in other towns it is a cat and dog melee most of the time? Is the fault yours or the "other fellow's?"

Are you as loyal as you should be if you are buying goods to any great extent of parties who have been published as being unwilling to co-operate with the association upon lines laid down by yourselves? If 3500 dealers should see it for their interests to absolutely withhold their trade from such houses, how long would it be before said houses would be enabled to see that their interests and those of the legitimate Hardware dealer were identical?

The secretary of the State association has but few complaints so far this year, possibly owing to the fact that most of the dealers are having all they can do, and possibly because many of the evils existing four or five years ago are remedied, or violations are committed so secretly as to be hard to locate.

Some Hardware dealers are trying to do all the business in their respective towns, ignoring any competition, when perhaps if they would recognize it their business at the end of the year would be more satisfactory and there would be something besides a few dirty feathers left in the nest.

Some dealers are adopting the system of marking their Pocket Cutlery and Shears with a diamond. It enables them to identify them in case of a theft.

Once in the Eastern country there was a goose ambitious to lay all the goose eggs of the whole world, and undertook the job, ignoring the fact that other geese there were, just as capable, ambitious and willing as she was. The result was a dismal failure, as Mrs. Goose found out after so strenuous an effort as to break down her own constitution, and she had reached the point where there was nothing but a bunch of feathers, and they, all bedraggled, in the nest, by which time she realized there were other geese and she could not monopolize the goose egg business.

The business of Schulte & Siecke, Freeport, Ill., has been purchased by the Messrs. McMullen of Chicago, who have organized a company under the style of the Freeport Hardware Company, with the following stockholders and directors: D. B. Schulte, F. W. Siecke, A. F. Schulte, David S. McMullen, Roger B. McMullen and Daniel Y. McMullen. Daniel Y. McMullen will make Freeport his home and take up the management of the business.

NOTES ON FOREIGN TRADE.

BRITISH LETTER.

Office of *The Iron Age*, Hastings House, Norfolk St., London, W. C., July 5, 1902.

The Week's Hardware Trade.

At present business men do not seem to have recovered from last week's dislocation. It is not unusual to find the second half of the year rather quiet, as at this period attention is generally, to some extent, distracted from serious affairs by the holidays. This year there is, however, a more pronounced lull, owing in some measure to the holidays arranged for the coronation. The untoward event of last week has placed some immediate check upon business, which is probably more sentimental than anything else, but there is a marked disposition to await the outcome of the quarterly meeting next week. The cessation of hostilities in South Africa has caused a slackening of military requirements, and there is some disappointment in this market as the requirements by the civil population are much below normal, for apart from orders for rolling stock and bridge work there is small demand.

Australia is taking a tolerably heavy weight of all classes of goods and New Zealand is buying at a fair rate. India and the Eastern countries are giving out encouraging lines and a steadier trade is being carried on in South America. Firms engaged in the electrical trades are kept busy, and also firms engaged in the production of bridge, girder and constructive work. In the silver branch Combination Cases continue to find a good market, chiefly for export, but London houses are not taking largely of this class of goods. During the last six months there has been a greater demand for Dram Flasks than has been experienced for a long time. This chiefly applies to sterling goods; for commoner classes of Flasks there is a very limited demand. There is little now to note in the Cutlery trade. The commoner grades of ivory handled goods are not in much demand, but a fair business is being transacted in the best qualities. Inquiries for this class of material are now more numerous and cutlers report better prospects than for some months past. Manufacturers of Scissors report that business is not overbrisk, few new orders coming to hand. The best class of Sheffield goods still meet with a steady sale among London distributors. Scissors in cases prove the best line at present and an attractive line of hammered silver work is selling freely. The trade suffers from a dearth of really first-class forgers and makers now find it very difficult to turn out work equal to that done some years ago. In price the Sheffield houses cannot compete with the Germans, who are now turning out their wares in a more attractive and highly finished manner than ever.

Prospects in Cape Colony.

During the first three months of the year the imports into Cape Colony were declared at £7,220,931, an increase of £2,380,211, compared with the first quarter of 1901. The most striking feature is the excess of imports over exports, which were only £2,421,190. This means that South Africa must be borrowing very heavily. It indicates further that until some balance between imports and exports is secured, that long promised trade boom will not arrive. Another point of interest is the growth of the transit trade between Cape Colony and the Transvaal. There are many authorities who now assert that the real commercial centre in South Africa will be Johannesburg. Germany is promptly showing its eagerness to be on the scene of action. The latest sign of this is that a number of German banks and financial houses have come to an agreement to establish in Johannesburg, with branches at Cape Town and Durban, a general agency for the purpose of developing German commerce throughout South Africa. A nominal subscription is to be made by those interested toward a fund to pay preliminary expenses, and all orders obtained are to be equitably distributed amongst the subscribing firms.

The British Tube Association Re-established.

Since the collapse of the British Tube Association nearly 12 months ago competition has increased and underselling assumed a most acute form. At length some of the leading manufacturers in the Midlands and Glasgow have decided to take steps to reorganize the trade and prevent the "cutting" of prices. The urgency of protective measures was emphasized when the recent advance of the minimum basis of gas strip to £7 a ton was declared. Accordingly a general meeting of the trade was held last week at Carlisle, as being the most accessible center for Scotch and Lancashire as well as Midland representatives. It is understood that there was a fully representative gathering, and after a lengthy discussion it was decided to reconstitute the British Tube Association, and that prices in the meantime be fixed on the basis of 72½ per cent. discount off the list of Gas, Steam and Water Tubes. A further meeting will be held to appoint a president, and it is expected that the headquarters will be fixed in Birmingham.

British Railway Companies and Freight Charges.

The railway companies do not show any signs of a more conciliatory attitude toward traders. Commencing July 1 they intend to be even more strict in enforcing their regulations in connection with traffic that manufacturers and others require to be conveyed at lower than the ordinary rates for carriage, which rates carry with them the condition that the traffic must be consigned at the owner's risk. The companies have two rates for the carriage of certain goods, perishable and other merchandise traffic, conveyed by goods or passenger trains, at either of which rates the same may be consigned at the sender's option: One, the ordinary rate when the company accepts the ordinary liability of a railway company; the other, the reduced rate when the sender agrees to relieve the companies over whose lines the merchandise may pass from all liability for loss or damage, &c. It appears to have been customary for many firms simply to describe their goods as undamagable, and the railway companies have accepted this as equivalent to a declaration of conveyance at owner's risk, but they have now come to the decision that such indefinite terms cannot now be accepted, as they do not clearly define the conditions of contract, and in future all manufacturers, traders and others desiring the benefit of the lower or owner's risk rate, will be required to fill up one of the railway companies' notes, which specify the conditions under which the traffic is carried at the reduced or owner's risk figure. This condition, although inflicting no extra cost on the traders, is an important one, as the railway companies will not apply the reduced rates unless the traders use their consignment notes. It will affect all the large senders of steel in bars or bundles, machinery, boilers, stoves, grates, furniture, ivory, &c. I wonder whether American traders would tolerate this pernickety way of doing business.

TRADE IN THE PHILIPPINES.

Extract from a letter just received from an American house doing a commission business in Manila:

You, without doubt, know all about the cholera we have been having here, and we regret to state that it is still with us and has hindered business matters a great deal on account of the quarantine which it has been found necessary to establish between different points in the islands. This has hindered communication and transportation and has been in many ways a very bad thing for the islands; but what has been our worst enemy in the commercial line has been the exchange problem, and we hardly see where we are coming out.

We were in great hope that Congress would do something to remedy the lamentable condition of affairs, but from the best information we are able to obtain, what Congress has done will leave us in practically the same condition as now. What we must have out here in order to transact our foreign business satisfactorily, or at least that business which is transacted with those countries which have a gold standard, is a stable cur-

rency. If the United States were a silver country it would do no harm to the merchant buying his goods exclusively from the United States to have a silver currency here, but with the United States on a gold basis it becomes necessary for us to have at least something approximating it in order to be able to calculate from time to time what our goods are going to cost us, as practically all transactions here in a business way are in silver. It is worthy of note that the recent violent fluctuations in the price of silver have not materially changed the prices of articles of purely local production or the prices of goods from Hongkong, which is a silver colony.

THE RETAIL HARDWARE DEALERS' MUTUAL FIRE INSURANCE COMPANY OF MINNESOTA.

THE RETAIL HARDWARE DEALERS' MUTUAL FIRE INSURANCE COMPANY of Minnesota, who were established by the Minnesota Retail Hardware Association for the benefit of its members, have recently issued a folder, in which the following statement of the company at close of business December 31, 1901, appears:

Income in 1901.

Premiums other than from assessments	$10,565.46
Rents and interest	630.57
Total income	$11,196.03

Disbursements in 1901.

Amount paid for losses	$2,344.98
Salaries of officers and employees	1,323.69
Taxes and fees	147.13
All other disbursements	298.45
Total disbursements	$4,114.25
Excess of income over disbursements	$7,081.78

Assets December 31, 1901.

Cash in office and in bank	$11,196.03
Total admitted assets	$11,196.03

Liabilities.

Reinsurance reserve	$5,282.73
Total liabilities, including permanent fund	$5,282.73
Net surplus	$5,913.30

Risks and Premiums, 1901 *Business.*

Fire risks written during the year	$535,075.00
Premiums received thereon	10,565.46
Net amount in force at end of the year	$535,075.00

The following particulars in regard to the company's business for the first six months of 1902 are also given:

First Six Months, 1902.

Risks written	$496,300.00
Premiums received	9,616.60
Losses paid	None.
Losses incurred	None.
Amount at risk	658,575.00

This company, as above stated, are primarily intended for the benefit of Minnesota Hardware merchants who are affiliated with the State Association. Members of Hardware associations in other States may, however, insure with them, a privilege of which a number of merchants in neighboring States have availed themselves. The company claim that nearly one-half the premium paid to old line companies is saved by insuring with them. Their losses for two and a half years have been less than $3700, and their total cash assets, July 1, 1902, are $19,378.10, without one dollar of indebtedness and no losses so far this year. Chas. H. Ladner, St. Cloud, the first president of the Minnesota Hardware Association, is president of the company, and M. S. Mathews, 323 Boston Block, Minneapolis, is secretary.

The firm of Wild Bros., who have conducted a Hardware, furniture and undertaking business at Evergreen, Ala., for the past six years, will be succeeded by a corporation capitalized at $25,000, on September 1. The style of the company will be the Wild, Jackson, Beaven Hardware Company. The members of the new corporation are the Wild brothers, L. Jackson and E. A. Beaven.

CASH PRIZES TO EMPLOYEES.

THE COLDWELL LAWN MOWER COMPANY, Newburgh, N. Y., each year set aside a certain sum of money to award as cash prizes to their employees for suggestions of a business character, either in regard to their conduct or as to the details of the work. These suggestions may be for improvement in manufacturing, for cheapening the cost of production, or in fact for anything in the way of an improvement in the business of the company. These prizes are awarded on the first of January and the first of July of each year. The last awarding of prizes was on the afternoon of July 1, when Thomas Coldwell, the president of the company, announced the awards for the last six months. This he did in his usual felicitous manner, speaking in a commendatory way of the men of the works and of their work. The first prize was of $25. There were two of $10 each, four of $5, and four prizes of $2.50 each. This makes a total of $75 distributed to employees of the company.

Nearly all of the suggestions made for which prizes were awarded were for something of a mechanical or technical nature pertaining to the manufacture of lawn mowers. But there was one notable exception to this rule. One of the two $5 prizes awarded to Joseph Coldwell, brother of Thomas Coldwell, was for a suggestion in regard to "First Aid to the Injured." The suggestion on this subject was made in the following words:

As a simple duty that an employer owes to his employees, and as a humane act, I think it absolutely necessary that some measure be adopted by the Coldwell Lawn Mower Company, such as first aid to the injured, whereby in case of accident, which may occur at any time in the factory, there may be an immediate assistance and intelligent help from one or more persons appointed for that purpose, who have had experience and thereby would know just what the emergency required for the alleviation of the suffering of the injured until the arrival of a physician.

Common justice to the employee should dictate that some such method of relief should be adopted at this writing. I have in mind now two persons in the employ of this company who are men of experience and who have had practical knowledge of the first aid to the injured, both having had a course of lectures on the subject, and one being an exmember of the ambulance corps.

I therefore suggest that these two gentlemen be consulted as to the necessary outfit for the first aid to the injured, and that the said Coldwell Lawn Mower Company procure and maintain at their own expense such outfit as may be suggested by the gentlemen referred to. The expense would be light and would meet a demand which consanguinity and the voice of justice requires as a safeguard for the employees of the Coldwell Lawn Mower Company.

As many of the suggestions made are good ones, and thoroughly practical, they are generally adopted by the company. From time to time, as the suggestions are made, they are handed in at the office, dated and filed away. At the proper time the envelopes are opened and the winners of the prizes determined upon.

Sometimes it will occur that two men will make precisely the same suggestion, although couched in different words. In a case of that kind the man whose suggestion bears the earlier date is awarded the prize. This system of cash prizes is a highly commendable one and reflects great credit upon the company and proves beneficial to the men in its employ.

The Webber-Ayers Hardware Company have succeeded the Webber-Seeley Hardware Company and the Ayers Hardware Company at Fort Smith, Ark. The following are the officers of the company: Walter Ayers, president; W. W. Webber, vice-president, and John Ayers, secretary and treasurer. The company have been organized with a capital of $150,000, $142,500 paid up, and will do an exclusively wholesale business in Hardware, Shelf and Heavy, Stoves, Tinware, Agricultural Implements, Sporting Goods, Wagons, Buggies, Coal Miners' Supplies, Pipe and Fittings, Belting, Packing, &c. Ayers & Co. will continue to do a retail business in Hardware and related lines.

CHICAGO RETAIL HARDWARE ASSOCIATION'S PICNIC.

THE eighth annual picnic of the Chicago Retail Hardware Association, which was to have been held at Palos Park on the 16th inst., has been postponed, on account of rainy weather, until Wednesday, 23d inst. The programme includes a number of contests and races, as follows: Women's bowling contest, men's bowling contests (open game and members only), married women's race, Hardware dealers' race (members only), single women's race, boys' race, tinners' race, baseball matches (open game and members only), and girls' race.

Prizes for these different contests have been presented by the following concerns, some of whom donated two or more prizes:

Ranney Mfg. Company.	American Can Company.
The Lumo Company.	J. D. Warren Mfg. Company.
Cleveland Foundry Company.	Wilcox Mfg. Company.
C. M. Avery & Co.	*The American Artisan.*
Brand Stove Company.	American Wringer Company.
Landers, Frary & Clark.	J. J. Vollrath Mfg. Company.
Wallis, Robinson & Co.	Reading Hardware Company.
C. Sidney Shepard & Co.	Bullard & Gormully Company.
George H. Bishop & Co.	L. Gould & Co.
New York Belting & Packing Company.	Lawton Cutlery Company.
	J. L. Perkins & Co.
Geo. M. Clark & Co.	Compton Shear Company.
Chas. Smith Company.	A. Freeman.
E. C. Atkins & Co.	Geo. W. Trout & Co.
Gilbert & Bennett Mfg. Company.	*The Iron Age.*

The committee in charge of the games consists of D. McLaughlin, L. Ronsenberg, Grant W. Porter, J. C. Schubert, J. M. Ruedell B. F. Boysen and J. C. Wirths, the judges on contests being W. H. Bennett, H. H. Roberts, Sidney Johnson, D. W. Simpson and J. D. Warren.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

Geo. B. Will has disposed of his Hardware business in Grand Rapids, Mich., to W. A. Hossack, who has had nearly 15 years' experience in this line, formerly as clerk for Foster, Stevens & Co., and Gunn Hardware Company, and for the past three and one-half years as traveling salesman. Mr. Hossack is rearranging the store and will make a number of improvements in it. He will be pleased to receive catalogues, &c., relating to Hardware and allied lines.

Cameron & Co., E. Cameron, proprietor, Charlottetown, Prince Edward Island, have just opened a store corner Queen and Richmond streets, and will carry a full line of Hardware, Paints, Oils, &c. They advise us they would be pleased to receive manufacturers' catalogues in these lines. Mr. Cameron has been in the Hardware business on Prince Edward Island for a number of years.

F. L. Helmes Company have succeeded the late W. P. Kyle in the Hardware, Stove, Crockery and Tin Roofing business in Orlando, Fla. The new proprietors have remodeled the store and increased the stock and will be pleased to receive catalogues and other printed matter relating to the above lines.

I. B. Williams & Sons, large manufacturers of Leather Belting and Lace Leather, are at the present time fitting up and stocking a very complete store in Philadelphia for the sale of their product, and will handle, in conjunction, a full line of Mill, Mine, Railroad and Engineers' Supplies and Power Transmission Machinery. The store is located at 722 Arch street, directly in the center of the supply district, and has been occupied for a number of years as a supply house. They have entered into partnership with Harry S. Huhn, who was formerly manager of James Smith & Co. for about 19 years, and later with James H. Billington, and Wm. J. M. Weaver, who was formerly manager for E. F. Houghton & Co. and later for James Smith & Co., and the management of the business will be under the direct supervision of these gentlemen. They will be pleased to receive catalogues from manufacturers in the above lines and to hear from those who are desirous of securing a Philadelphia agency for the sale of their products.

DEATH OF JAMES A. FONES.

JAMES A. FONES, long the vice-president of the Fones Bros. Hardware Company, Little Rock, Ark., died at his home in that city, July 4, after an illness of six months, which was not looked on as dangerous, however, until about two weeks before he died.

Mr. Fones was born in Decatur, now a part of Atlanta, Ga., in November, 1839. He received his education in the country schools in the vicinity of Rome, Ga. In 1860 he took up his residence in Little Rock, where he remained during the Civil War. After the war, upon the return of his brother, Daniel G. Fones, they became associated in the Hardware business, under the title of Fones Bros., the Fones Bros. Hardware Company being organized in 1889.

In 1888 Mr. Fones was elected president of the Little Rock Board of Trade, in which position he served several years, being a director at the time of his death. Mr. Fones was also president of the Arkansas River Commission, which compiled the statistics of the Arkansas Valley in 1892, for the use of Congress, which resulted in obtaining the largest Congressional appropriation ever awarded for that improvement, it is said. Mr. Fones always interested himself in the material welfare and advancement of the city and took a prominent part in its progress and growth. He was a charter member of the Little Rock Building Association, of which he had been president for many years. The funeral services were held in the First Presbyterian Church of Little Rock, in which he was a deacon and an active worker.

NEW DEPARTURE MFG. COMPANY'S NEW CATALOGUE.

THE NEW DEPARTURE MFG. COMPANY, Bristol, Conn., for whom John H. Graham & Co., 113 Chambers street, New York, are selling agents, taking the entire product, have just issued a new illustrated descriptive catalogue of plumbers' brass goods, showing a comprehensive line of Compression Bibbs, plain and hose, with T handles, both for lead pipe and iron pipe with shoulder. They also make the same assortments with stuffing box, together with a series of Compression Bibbs with screw on tail, both plain and hose. In addition to the above they make Lever Handle Bibbs for lead and iron pipe, Brass Racking Cocks, fast and loose key to screw or drive, Brass Liquor Cocks, Bottling Cocks, Compression Lock Cocks, Compression Wash Tray Bibbs, &c. This is a new line of goods with the company, which will be supplemented from time to time. They can be furnished in the rough, finished and polished and nickel plated. Emphasis is laid by the company on the uniform thickness of the walls of the Bibbs and Cocks.

THE SHERWIN-WILLIAMS COMPANY.

THE SHERWIN-WILLIAMS COMPANY, Cleveland, Ohio, are distributing an especially attractive counter book relating to their various paints and varnishes, also booklets, one of which is designed for the iron trade, while the other relates to Metalastic, their new product for metal surfaces. This is the company's old paint "P. M. 5" improved, retaining, it is stated, all the good qualities of the old paint with many improvements. It is referred to as a right combination of carbon, graphite and specially treated pure linseed oil for an elastic metal paint imperviable to air and moisture. The company advise us that they have completed a large linseed oil plant and will soon begin crushing seed. They will not only make all the oil used by them in the manufacture of their products, but will also enter the general market.

PRICE-LISTS, CIRCULARS, &c.

NATIONAL SPECIALTY MFG. COMPANY, Philadelphia, Pa.: Catalogue relating to Sausage Stuffers, Lard Presses, Measuring Pumps, Coffee, Spice and Drug Mills, Measuring Faucets, Fruit Presses, &c. These goods are illustrated in the colors in which they are actually finished, which greatly enhances the value of the catalogue.

SCRANTON BOLT & NUT COMPANY, Scranton, Pa.: Bolts and Nuts, Coach and Lag Screws, Spikes, Bar Iron, &c. Catalogue No. 2 illustrates their product, which is characterized as the Diamond Z brand.

ONEIDA COMMUNITY, Kenwood, N. Y.: Catalogue No. 24 A, Hardware Specialties. This is devoted to Traps, Chains and Snaps, with illustrations, descriptions and list prices.

THE CHICAGO HARDWARE MFG. COMPANY, Chicago: Catalogue No. 6, illustrated, well printed and substantially bound. Pages 2 to 63 are devoted to Latches and Locks of various sizes and designs. Illustrations of Knobs and general Hardware in plain and artistic designs are found on pages 71 to 149. On the remaining pages are shown plain bronze general Hardware, Hinges, Cabinet Trimmings, Hinge and Kick Plates. The company call special attention to the independent Knobs and to some of the special features of the Locks they are placing on the market.

JONES OF BINGHAMTON, Binghamton, N. Y.: Select price-list for the Hardware trade of the different grades and sizes of Scales in general demand.

THE SHUNK PLOW COMPANY, Bucyrus, Ohio: New Model Plows and Steel Farm Wagons. Catalogues describe and illustrate these goods.

THE MURALO COMPANY, New Brighton, N. Y.: Catalogue showing colors for interior wall decoration and fresco work; also Weather Proof Cold Water Paint, &c.

COLUMBIAN CORDAGE COMPANY, Auburn, N. Y.: Catalogue devoted to Rope and Binder Twine, including Transmission and Hoisting Ropes, Oil Well Drilling Cables, Steamboat and Wrecking Lines, Ship Hawsers, &c. The catalogue also contains an interesting illustrated article on "Rope and Rope Making, Ancient and Modern," and also a brief description of the methods followed in manufacturing Rope at the Columbian mill.

THE SPALDING ST. LAWRENCE BOAT COMPANY, Ogdensburg, N. Y.: Catalogue relating to River Skiffs, Rowboats, Paddling Canoes, &c.

THE GLEASON, BAILEY & SCIPLE MFG. COMPANY, Seneca Falls, N. Y.: Circular showing Brass Double Cylinder Force Pumps and Double Acting Suction and Force Pumps. Also a catalogue of Fittings for steam and hot water, of standard gas pipe sizes, which shows these goods made with a cast thread by a patent process owned and controlled by the company.

THE HARTMAN SLIDING BLIND COMPANY, Crestline, Ohio: Hartman Sliding and Folding Partitions. An illustrated catalogue shows these goods operated by antifriction ball bearing carriages. They are designed to divide up and enlarge several rooms, such as Sabbath school rooms and church audience rooms, public halls, classrooms, &c.

RUMSEY & CO., Seneca Falls, N. Y.: Fifty-third edition of illustrated catalogue devoted to Hand and Power Pumps and Hydraulic and Pumping Machinery for all purposes. Among the new and improved goods shown are Double Acting Force Pumps, Wind Mill Double Acting Force Pumps; Deep Well Working Heads, Brass Soda Water Pressure Pumps, &c. The catalogue is well printed and contains more than 250 pages.

THE STENGEL MFG. COMPANY, Hamilton, Ohio: Circular devoted to the Stengel Patent Casters, adapted for use on light or heavy furniture.

J. D. WARREN MFG. COMPANY, Chicago, Ill.: Celluloid covered vest pocket memorandum book, pertaining to Hardware Shelving and correct arrangement of stock. A large amount of useful information as well as blank pages for memoranda is contained in the book.

THE ATLAS GUN COMPANY, Ilion, N. Y.: Single Shot Air Guns, Repeating Air Rifles and .22 Caliber Target Rifles. In regard to the No. 4 Cartridge Rifle, 1902 model, the manufacturers remark that it is an accurate shooting, low priced and attractive modeled small bore Rifle. It is chambered for .22 short or long cartridges, measures 34 inches over all and weighs 3 pounds.

BUFFALO EMERY WHEEL COMPANY, Buffalo, N. Y.: Catalogue relating to Emery and Corundum Wheels, Cylinders and Cup Wheels, Oil Stones, &c.

THE ENTERPRISE ENAMEL COMPANY, Bellaire, Ohio: Catalogue of second grade Enameled Ware. The company advise us that they are moving old machinery and installing new presses in a substantial brick and stone building adjoining their present works, which will double their capacity. Another building of the same character is contemplated, which will give much needed space in their pressrooms.

THE GOODWIN & KINTZ COMPANY, Winsted, Conn.: Catalogue No. 20, pertaining to Gas and Electric Portables and Newels. These high grade goods are illustrated in a variety of attractive forms. The company also produce Mirrors, Vases, Clocks, Candelabrum and Candlesticks, Five o'Clock Teas, Photograph Frames, Premium Goods, &c.

THE UNION HARDWARE COMPANY, Torrington, Conn., New York office in charge of Tower & Lyon, 95 Chambers street, New York, have issued a revised catalogue, envelope size, illustrating and describing their large line of Ice Skates in great variety, together with telegraph code at back to facilitate ordering by wire. Among the newest goods is an improved form of Union Ice Creepers and the Union Skate Sharpener.

C. H. ELLERT, Evansville, Ind.: Circular describing a number of Repair Outfits for repairing shoes, harness, rubber and tinware. Also one relating to Ellert's Dragon Oil Waterproof Dressing, which is intended to soften, preserve and waterproof harness and all kinds of leather. Mr. Ellert also manufactures Rubber Stamps, Stencils, Seals, Checks, Badges, &c.

TRADE ITEMS.

THE TRUSS & CABLE FENCE COMPANY, Youngstown, Ohio, which have taken over the business of the Hornellsville Fence & Cable Company of Hornellsville, N. Y., and will remove the works to Youngstown, have effected an organization and have elected W. A. Reade president; Carl Horix, vice-president, and W. W. Bonnell, secretary and treasurer.

THE GRIFFIN MFG. COMPANY, Erie, Pa., decided at their annual meeting to increase their capital to $300,000. The company are making additions to their plant to meet their growing requirements in the line of Strap and T Hinges, and they are also preparing to engage extensively in the manufacture of a kindred line of Hardware.

MINNEAPOLIS IRON STORE COMPANY, Minneapolis, Minn., have purchased the iron stock formerly carried by Janney, Semple, Hill & Co. of that city. The purchase includes iron, mild steel, No. 14 and heavier, tank steel, tool steel, cold rolled shafting, &c. The Minneapolis Iron Store Company are building an additional warehouse to take care of the increased stock.

AT the recent meeting of the directors of the Colt's Patent Fire Arms Mfg. Company, Hartford, Conn., Lewis C. Grover was elected president and a director to succeed the late Hon. John H. Hall. At the same time other officers of the corporation were elected as follows: Vice-president, E. Ely Garrison; treasurer, Frank A. Schirmer; assistant treasurer, James S. Bryant. Subsequently a meeting of the directors of the Colt's Arms Company was held for the election of officers of that corporation and to fill the vacancy in the presidency caused by the death of Mr. Hall. The following officers were elected: President, Lewis C. Grover; vice-president, William C. Skinner; treasurer, Frank A. Schirmer; secretary, J. H. Brookfield. Lewis C. Grover, the new president of the Colt companies, was born in Springfield, Mass., and is now 53 years of age. Until his elevation to the presidency Mr. Hall was superin-

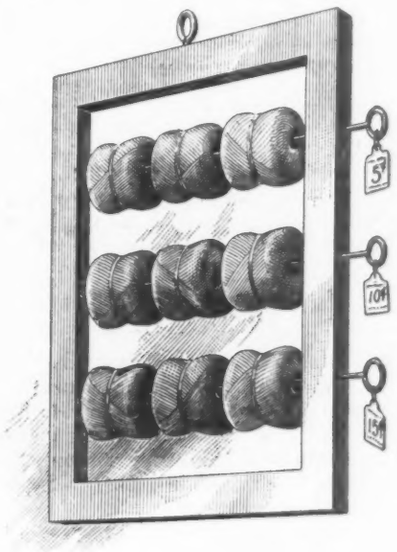
tendent, and had immediate charge of the manufacturing. The Colt's Arms Company, the practical successors of the Colt's Patent Fire Arms Mfg. Company, were incorporated under the laws of New York State June 20, 1900, and acquired the entire capital stock of the Colt's Patent Fire Arms Mfg. Company. The authorized capital stock is $2,500,000.

THOMSON BROS. & Co., manufacturers of the Improved Seavey Miter Box, have disposed of their entire business to the Smith & Hemenway Company, 296 Broadway, New York, who will add this article to the extensive line of specialties which they are putting on the market.

THE baseball team of Alfred Field & Co., New York City, has won the following games so far this season: June 14, with Russell & Erwin Mfg. Company, score, 14-13; June 28, with the Ward Line, score, 11-6; July 12, with H. L. Judd Company, score, 20-1. They are desirous of arranging games with other teams in the Hardware trade.

FRAME FOR HOLDING TWINE.

IN the store of Valentine Weidig, Unionville, Conn., is the little wooden frame shown in the accompanying illustration. There are three holes in each side



Frame for Holding Twine.

and through each set of holes is passed a 3-16-inch iron rod, one end of which is bent in the form of a handle. These rods are run through and support the balls of twine, as illustrated. To the handle on each rod is fastened a tag, giving price of the twine on that rod. The frame is hung where it can be readily seen by means of the screw eye shown on the top.

CLARK, HORROCKS & CO.

CLARK, HORROCKS & CO., Utica, N. Y., in their "Fisherman's Annual" for 1902, show an extended line of high grade fishing tackle. This includes Rods, Lines, Reels, Spoon and other Bait, Floats, Flies, Hooks, Spears, Nets, Tackle Boxes, Bait Pails, &c. The catalogue contains 158 pages and apparently covers all requirements of fishermen's paraphernalia.

Ice & Higginbotham have disposed of their Hardware business in New Castle, Ind., to Vern Stout and Frank Personett, who will continue under the style of Stout & Personett. The members of the former firm will hereafter devote their attention entirely to their Shovel factory, which will begin operations some time during the month of July.

AMONG THE HARDWARE TRADE.

Renick Hardware Company have lately opened up in the Hardware, Tinware, Paint and Oil and furniture business at Falling Spring, W. Va.

Abram H. Tower, in the Hardware, Stove, Agricultural Implement and plumbing business in Stoughton, Mass., has been succeeded by W. P. Hutchinson.

John C. Pruitt of Silver City, Ga., and E. R. Barrett of Cumming, have bought an interest in the Hardware business of S. W. Davidson & Co., Gainesville, which will be continued without change in style. The capital stock has been increased from $20,000 to $35,000, and the concern expect hereafter to do principally a jobbing business.

Clark Hardware Company, Lynchburg, Va., have opened a retail department in connection with their wholesale business.

Theodore M. Lyon, who for several years has conducted a general store at Westford, has become a partner with Harvey Chapman in the retail Hardware business in Stafford Springs, Conn. The style has been changed to Harvey Chapman & Co.

Miller & Staker are successors to Fred. Miller in the Heavy Hardware and Agricultural Implement business at Woodward, Iowa.

Slaba & Wagner, Hardware, Stove and Harness merchants, Buffalo Center, Iowa, have been succeeded by H. A. Wagner.

Gibson Bros. are successors to J. C. Gibson in the Agricultural Implement, Pump and Wind Mill business in Maxwell, Iowa.

Thompson Bros. of Muscatine, Iowa, have opened another store at East Las Vegas, N. M., under the style of Thompson Hardware Company. They handle Shelf Hardware and Sporting and Athletic Goods.

Thos. Neal Hardware Company have purchased the business formerly conducted by James Hobb at Vincennes, Ind.

Norwood & Stringfellow have succeeded B. F. Cooper in the Hardware, Stove, Agricultural Implement and Sporting Goods business in Oakdale, Neb.

R. Donald McKee of McKee Bros., Hardware merchants, Hagerstown, Md., will engage in the jobbing and retail Hardware business about October 1 next.

The Smith Hardware Company, recently incorporated, are successors to W. B. Smith at Kane, Pa. The company occupy a new building 34 x 100 feet, in dimensions.

J. C. De Laporte has succeeded De Laporte & Lofton in the Hardware, Stove and Farm Implement business in Ladonia, Mo. Mr. De Laporte has adopted the cash system of doing business. He is also remodeling his store.

Allen Brown & Co. have lately commenced the Shelf Hardware and Tinware business in Stafford Springs, Conn.

W. W. Corkins has purchased the retail Hardware, Stove, Tinware, Farm Implement and Sporting Goods business at Fulton, S. D., formerly conducted by Holmes & Howe.

W. T. Peters, Algonquin, Ill., has disposed of his Hardware, Stove and Tinware business to S. D. Baxter, who continues at the old stand.

The Hardware and Stove firm of T. J. Carman & Co., Mayfield, Ky., have dissolved. T. J. Carman is successor.

D. J. Farnsworth, Waterville, Ohio, has been succeeded by the Waterville Hardware & Supply Company.

Lynwiler & Son, dealers in Hardware, Stoves, Tinware, Agricultural Implements, Sporting Goods, &c., are closing out their business in Greencastle, Mo.

F. E. Sherwin has lately engaged in the sale of Hardware, Agricultural Implements, Buggies, Wagons and Harness, at Ralston, O. T.

Miller & Flaigle, Kansas City, Mo., who started in business about six months since, have incorporated under the style of Miller-Flaigle Hardware Company. The company are dealers in Iron and Steel, Builders' Hardware, Sporting Goods, &c. They have lately completed a small addition to their store building.

M. L. Montgomery has purchased the Hardware and Tinware business of Wm. Graham, Creighton, Neb.

The Hardware store of S. C. Mensch, Marienville, Pa., has been badly damaged by fire. Mr. Mensch has commenced rebuilding.

The Hardware store of T. B. Turner at Alexander City, Ala., has been destroyed by fire.

Phillips & Callin, dealers in Hardware, Stoves and Agricultural Implements, Bloomfield, Iowa, have been succeeded by Hardy & Son.

Skalak & Atwood have succeeded Skalak & Son in the Hardware, Stove, Agricultural Implement and Windmill business in Humboldt, Neb.

S. T. Doher, Hardware merchant, Franklin, Neb., has sustained a fire loss of $3300, with insurance of $1200.

F. J. Evans & Co., dealers in Hardware, Stoves and Tinware, Corsicana, Texas, have been succeeded by J. E. Deckard, who will continue at the old stand. Mr. Evans will embark in the furniture business in the fall, handling also Stoves, Tinware and Household Goods.

E. R. Tutt, after 15 years' activity, has disposed of his Hardware, Stove, Plumbing and Heating business in Oakland, Cal., to the Ingram Hardware Company, comprising Wm. Ingram, Wm. McCaslin and John S. Gallagher. Mr. Ingram was formerly a member of the Schaw, Ingram & Batcher Company of Sacramento, where he has been located for a period of 30 years. The present commodious store at 511 and 513 Thirteenth street is to be renovated throughout. Mr. Tutt's headquarters will hereafter be in San Francisco, where he will do contract plumbing exclusively.

MISCELLANEOUS NOTES.

The Sheffy Automatic Folding Seat.

The Dexter Mfg. Company, Troy, Ohio, are offering the Sheffy automatic folding seat, which is referred to as made of the best spring steel and canvas, and as being capable of supporting a person weighing 200 pounds. When the seat is closed it is 22 inches long and 1¼ inches in diameter. It weighs 18 ounces and is inclosed in a neat canvas case. This makes it light and convenient to carry or to pack in a trunk or bag. The point is made that the folding of the seat is automatic and that it will be found convenient and serviceable in all places where standing would be tiresome. The seat is alluded to as suitable for use by tourists and for outings, including parades, excursions, park gatherings, picnics, camp meetings, workshops, &c.

The Tryon Wrench.

Geisel Mfg. Company, Springfield, Mass., who are making a line of hardware specialties, are now making the Tryon patent wrench, having bought the patent rights from the inventor. The tool is made of cast steel, nickel plated, and is a combination of monkey wrench, pipe wrench, tap wrench, bicycle wrench, drill brace and vise. The company state that there is no "give" to the jaws of this wrench, and that each feature of the tool is individually strong. It is referred to as a handy implement to have in the house, office or store, or to carry in a buggy, wagon, automobile or yacht, and as belonging in every mechanic's kit. It is made in five sizes, the largest size being 10½ inches in length.

Grommets.

The Rimmon Mfg. Company, Seymour, Conn., manufacturers of eyelets and brass, bronze, German silver and copper washers and blanks, have lately commenced making a line of grommets. They issue a folder showing some of the sizes in which their eyelets and grommets and washers are regularly made, special sizes being made to order.

Steel Stable Fixtures.

The Wilcox Mfg. Company, Aurora, Ill., have placed upon the market a set of stable fixtures, including a saddle or harness holder, tool holder and whip holder, as shown in the accompanying illustrations. The articles are made of steel and are recommended by the manufacturers as being light, strong, durable and cheap.

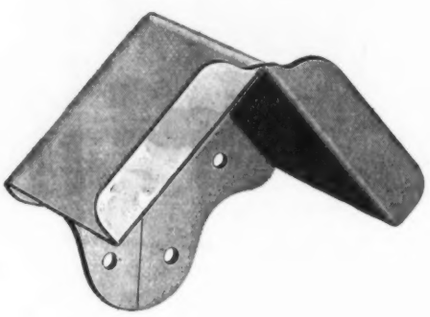


Fig. 1.—Saddle or Harness Holder.

Fig. 2.—Tool Holder.

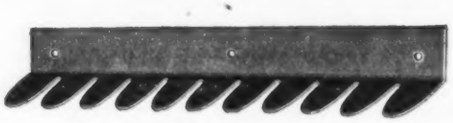
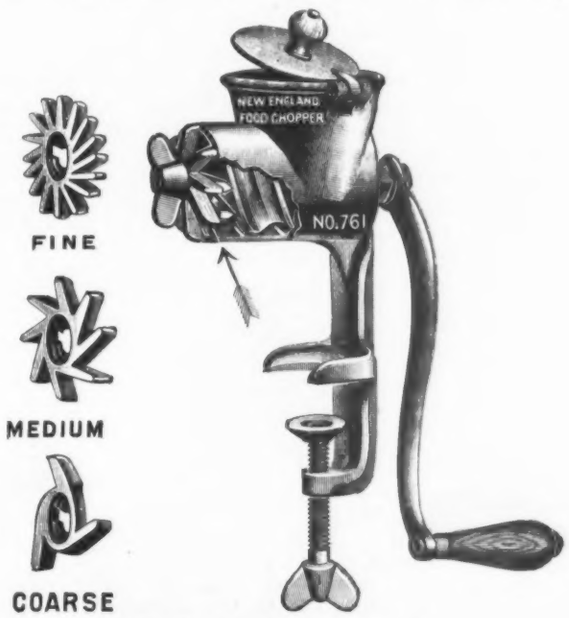


Fig. 3.—Whip Holder.

The New England Food Chopper.

Illustrated herewith is a food chopper put on the market by the Smith & Hemenway Company, 296 Broadway, N. Y. Referring to the chopper, the company state that all cutting surfaces are ground, insuring perfect accuracy at the most essential points, and that all parts are made to gauge, are interchangeable and that duplicate parts can be furnished at any time. The three self sharpening knives shown at the side of the chopper vary in degree of fineness, allowing coarse, medium or fine chopping, as desired. The use of the lid does away



The New England Food Chopper.

with the necessity of pressing the food to be cut against the screw with the fingers. Among the points of excellence the following are mentioned: That the chopper is simple in construction, easily cleaned and easy to operate; that all of its cutting edges are sharp and its knives self sharpening; that it is heavily coated with pure tin, preventing corrosion; that the machine cuts and does not bruise, mash or tear the food; that the food is carried forward by the screw from the hopper to the front end of the case, where it is cut by the sharp edges on the inner side of the discharge openings, and is then severed into pieces of the desired size by the final cutting of the outside steel knives. The chopper can be used, it is explained, to chop raw or cooked meat, chicken, turkey, game, lobster, oysters, clams, tongue, giblets, suet, figs, citron, raisins, apples, nuts, spices, potatoes, cabbage, onions, carrots, celery, parsley, horseradish, slaw, &c.; also in preparing beef tea, sausages, puddings, soups, mincemeat, hash, stuffings, sandwiches, relishes, salads, fruit and nut cake, chow chow, gravies, veal or chicken loaf, Welsh rabbit, croquettes, potted meats, fish cakes, cracker dust, bread crumbs, patties, fruit sauces, &c.

The Randolph Hand Corn Planter.

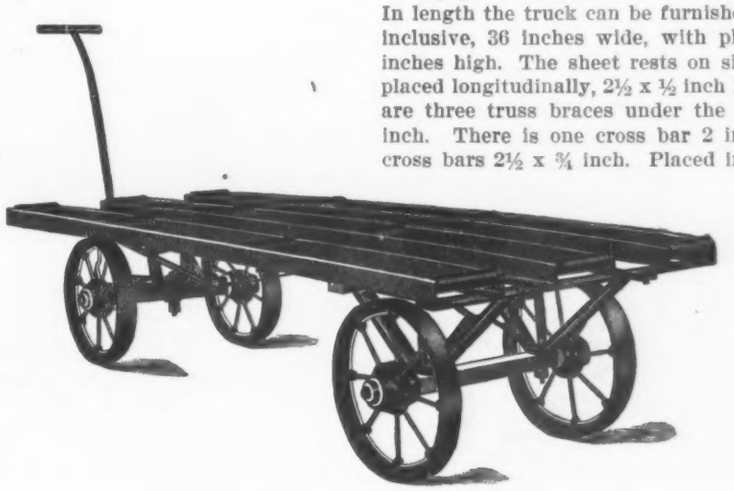
Duane H. Nash, Millington, N. J., is offering the hand corn planter shown herewith. It is all metal, mostly

The Randolph Hand Corn Planter.

steel, with no wood work except the handles. The point is made by the manufacturer that it is the lightest hand planter on the market, even lighter than the ordinary wooden planters. Among other points of excellence the following are mentioned by the maker: That it is indestructible and automatic, that it contains no springs or ratchets and that it is easily adjusted.

Sheet Metal Truck.

The Fairbanks Company, 416-422 Broome street, New York, who manufacture hand trucks for handling all kinds of materials in a variety that exceeds 100 styles and patterns, have now put out the sheet metal truck here illustrated. It is designed for use in rolling mills or any place where sheet metal must be hauled about. In length the truck can be furnished from 10 to 14 feet, inclusive, 36 inches wide, with platform uniformly 28 inches high. The sheet rests on six strips of angle iron, placed longitudinally, 2½ x ½ inch in dimensions. There are three truss braces under the frame, each 1¾ x ⅜ inch. There is one cross bar 2 inches square and six cross bars 2½ x ¾ inch. Placed in the top of the platform to receive the metal sheets are 12 steel rollers, each 2 x 8½ inches, on which the sheets roll in the process of loading or unloading. The axles are 2½ inches square, with heavy steel braces front and rear. The metal wheels are 21 inches in diameter, with 3-inch face, and have 14 cold drawn steel rolls in each hub, the rim of the wheels being cast iron, with wrought iron tires shrunk on and wrought iron spokes. The fifth wheel is 15 inches in diameter. As the materials in this construction are entirely metallic the truck can be run into an oven with its contents if so desired.



Sheet Metal Truck with Roller Top.

Improved Banner Oil Heaters.

The Plume & Atwood Mfg. Company, Waterbury, Conn., and 29 Murray street, New York, have put on the market a group of improved Banner oil heaters, one of which is here illustrated. What especially distinguishes this make of heater is the automatic safety stop which prevents the flame from getting above the safety point. Neither will it smoke or give off an odor when

Improved Banner Oil Heater, Size 3.

extinguished, because, as shown in Fig. 2, the stop nut A limits the upward movement of the flame spreader B and the flame spreader B limits the upward movement of the wick. The wick, whether raised or lowered, always has a metallic rim resting on the top of it, the flame reaching the oil as it follows the wick upward at the side of the wick instead of directly on top, as is customary. Thus when the wick is raised for lighting the rim rests on the top and keeps it even, and when lowered to put out the flame is instantly extinguished, as the wick is then inclosed by metal both top and sides. The founts, which hold variously 3 pints, 1 gallon and

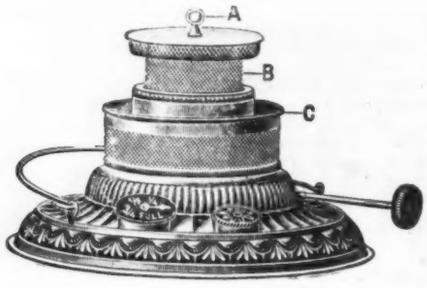


Fig. 2.—Burner with Automatic Safety Top.

2 gallons of oil, have an automatic filling indicator, by means of which the amount of oil in the fount is shown at any time from one-quarter, one-half and three-quarter full to entirely full. This is accomplished by means of an air tight float that in rising turns a partially twisted rod that moves the pointer at the top. The heaters can be supplied in different sizes, which for the purpose of approximating size are, roundly speaking, 19¼ inches high, with 6-inch drum, others being respectively 23, 25, 26½ and 33 inches high and proportionately larger in diameter. The smaller one has a 5-inch round wick, the largest a 12-inch round wick and the three intermediate sizes 9-inch round wicks. All have wire bails for carrying and tip backward for lighting but one which is contained in an ornamental four-leg cast iron frame, something like a brass parlor table, and has a cast iron top. They are finished in japan and nickel.

Electrically Lighted New Rochester Lamp.

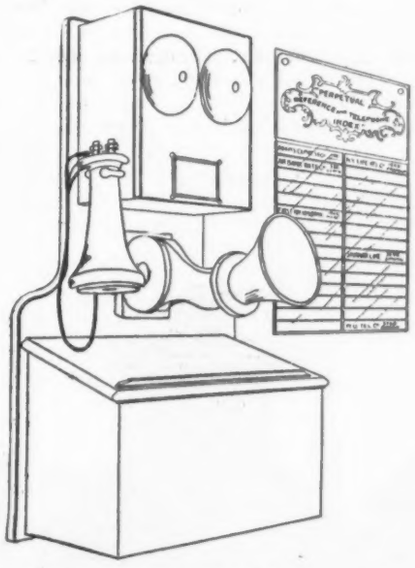
The Rochester Lamp Company, 38 Park place, New York, have just put on the market the New Rochester electrically lighted matchless lamp, as here shown. The purpose of this construction is to provide a high grade lamp that can be instantly lighted by merely pressing a lever located in the central part of the standard just above the circular base. In the base are two dry electric batteries, a pressure of the small lever closing the circuit, so that the wick when turned up to a suitable hight is ignited, the sparking device burning only as long as the spring lever is depressed. The batteries are said to have a capacity for igniting the wick for a year.

New Rochester Electrically Lighted Lamp.

as a lamp is ordinarily used. By means of this device not only are no matches required, but the lamp can be lighted in the dark as conveniently and expeditiously as gas is ignited in hall or room by pressing a wall button. The wick raiser is a round thumb screw, which gives the wick a circular movement by means of a positive action. The lamp as now equipped with batteries is a well-known standard pattern of the New Rochester type, finished in polished brass, nickel and antique copper, but special finishes can be made to order. It is the intention to apply this system to various other styles of the New Rochester lamp in the near future. Extra batteries, which are of a standard type, can be furnished from the main house or branches, here or abroad. The Rochester Lamp Company were reorganized a few months ago, at the same time establishing their own factory in New York, which is equipped with new and modern machinery for the manufacture of both the Rochester and New Rochester lamps, of which this company are the sole owners and patentees.

Telephone Reference Index.

Henry J. Van Gelder, 196 Hooper street, Brooklyn, N. Y., is putting on the market the Perpetual reference and telephone index, here illustrated, for which patent has been applied for. The frame, of pressed tin, is 6⅛ x 12⅝ inches in size, with recesses ½ x 3 inches each—30 in all—in which to place cards of the proper dimensions furnished with the index. The surface of the index used for the cards is protected by glass, which is held top and bottom by lugs punched through the

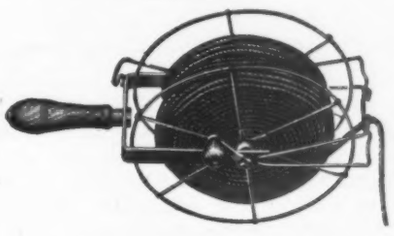


Perpetual Reference and Telephone Index.

metal and turned forward. The front surface is enameled in yellow, with an ornamental lithographed heading. In use the names most commonly required in telephoning are placed on the cards and then arranged alphabetically, a marked advantage of this construction being that it can be instantly rearranged at will as occasion demands and always kept up to date, while at the same time the names and telephone numbers are kept fresh and legible by the protecting glass. The back is reinforced by two strengthening ribs of tin soldered to the back on each side.

The Lawson Clothes Line Reel.

The accompanying cut represents a clothes line reel being put on the market by the Lawson Mfg. Company, Chicago, Ill. The reel is provided with a wire brake controlled by the thumb of the hand which holds the handle, while the rope passes through a loop made by



The Lawson Clothes Line Reel.

two wires extending from the axle beyond the circumference of the wheel. The pressing together of these wires catches the rope and holds it securely. The wheel is made of galvanized wire and the holder of galvanized iron with a wooden handle attached. The reel is referred to as being simple and practical.

O'Donald & Taylor Hardware Company and Dozier & Gay, Jacksonville, Fla., have consolidated under the style of Dozier & Gay Hardware & Paint Company, who will continue the wholesale and retail business in Hardware, Sash, Doors and Blinds and Paints.

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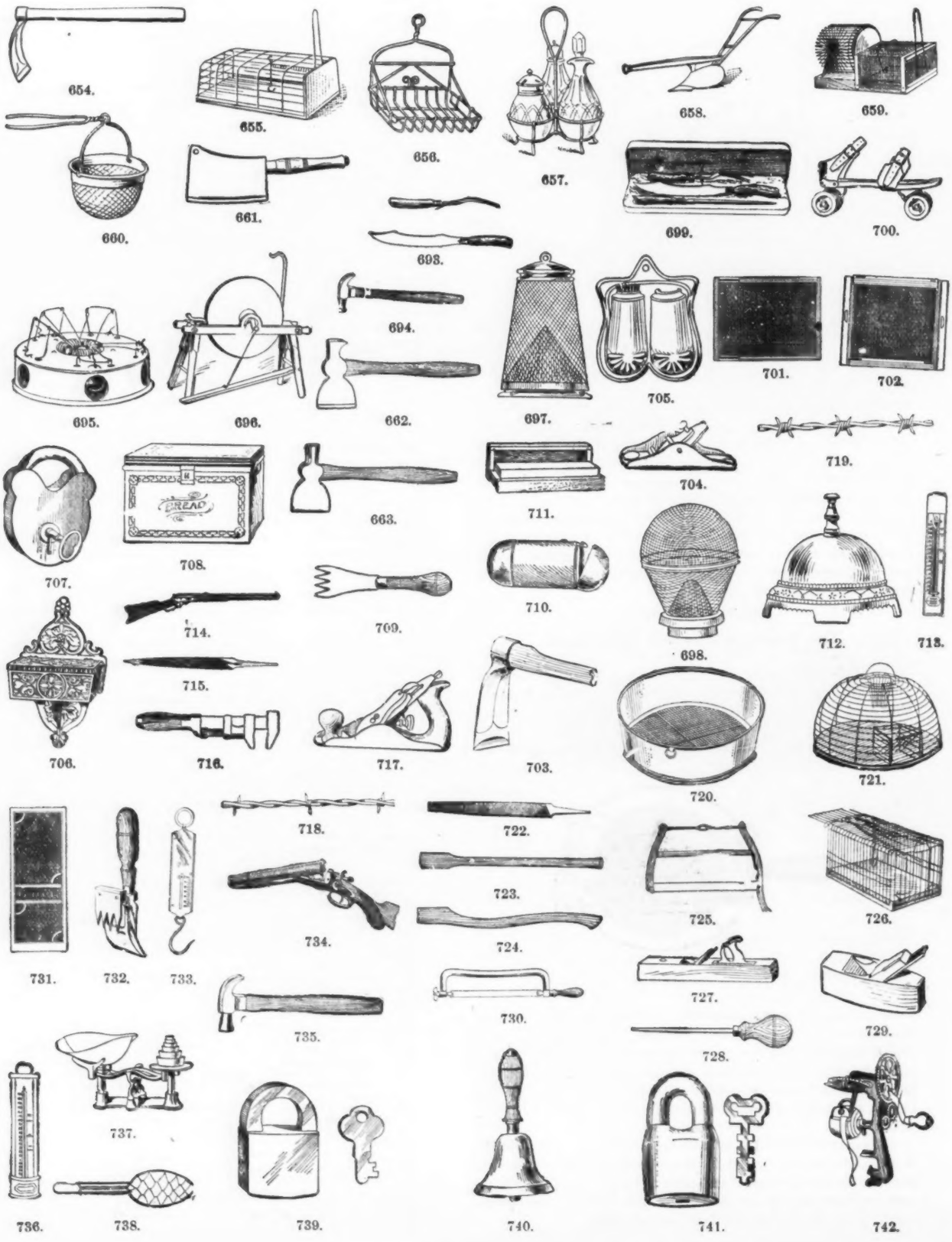
PUBLISHERS' DEPARTMENT.

The Iron Age Advertising Cuts.

We illustrate herewith some recent additions to our line of advertising cuts for hardware merchants. The cuts, it will be observed, are of small size, permitting the use of a number of them in a single advertisement occupying a moderate space. The price of these cuts is 20 cents each. Discounts: 6 to 20 cuts, 16 2-3 per cent.; 20 to 40 cuts, 20 per cent.; 40 or more cuts, 25 per cent. Nearly 200 small cuts of salable articles are comprised in this line, together with numerous cuts of special designs suitable for advertising various articles. Our 16-page circular, with prices, illustrating our line of advertising cuts, will be sent on request.

DAVID WILLIAMS COMPANY,
232-238 William St., New York.